A Research Design and Context for Prehistoric Cultural Resources in the Uncompahgre Plateau Archaeological Project's Study Area, Western Colorado

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Background

The Uncompahgre Plateau Archaeological Project (UPAP) represents a concerted effort by the Bureau of Land Management, the Uncompahgre National Forest, and Western Area Power Administration to comprehensively manage the archaeological resources of western Colorado's Uncompahgre Plateau. The Uncompahgre Plateau has long been known for its archaeological resources. Prehistoric site densities, in places, approach one site per 10 acres. These irreplaceable resources, however, are becoming increasingly threatened by development, erosion, wildfire, fire-suppression activities, recreational use, grazing, and other agents. The stated goals of the UPAP are:

- Retrieve valuable archaeological data before they are lost;
- Apply the information gained by the project to better evaluate the significance of the cultural resources and to better identify which sites are worthy of protection, research, and/or listing on the National Register of Historic Places;
- Provide a broader and richer understanding of the prehistoric occupation of the Uncompahgre Plateau; and,
- Improve planning of hazardous fuels reduction and reforestation projects with respect to cultural resources.

To achieve these goals, the agency consortium contracted with Alpine Archaeological Consultants, Inc. to write a prehistoric context and research design for the UPAP study area and to develop site sensitivity maps. This report comprises a context and research design. The context and research design builds on the recent publication titled *Colorado Prehistory: A Context for the Northern Colorado River Basin* by Reed and Metcalf (1999). The UPAP product is not meant to supplant the research design for the broader region, but to augment it. A separate submission will focus on the effects of various vegetation treatment types on prehistoric and protohistoric cultural resources. The sensitivity maps will constitute a third submission.

Description of the Project Area

The UPAP study area is in western Colorado in portions of Mesa, Delta, Montrose, Ouray, and San Miguel counties. It is centered on the southern
part of the Uncompahgre Plateau, south of Unaweep Canyon and encompasses roughly 1,629,037 acres. The crest of the Uncompahgre Plateau is mostly managed by the Uncompahgre National Forest. The lower slopes have extensive areas administered by the Bureau of Land Management's Uncompahgre, San Juan, and Grand Junction Field Offices. Private landholdings are interspersed throughout the study area, but are especially prevalent in the lower valleys where agriculture is possible.

As mentioned, Unaweep Canyon serves as the study area's northern boundary. The Gunnison and Uncompahgre Rivers comprise the eastern boundary; the towns of Delta, Olathe, Montrose, and Ridgway are situated along these rivers. The southern boundary is formed by the Leopard Creek and the San Miguel River. Southeast of the town of Norwood, the boundary departs the San Miguel River southward to include the vicinity of Miramonte Reservoir. The boundary then proceeds northwesterly to the vicinity of Naturita on the San Miguel River. This area south of the San Miguel River, encompassing Miramonte Reservoir and the town of Norwood, is not technically

on the Uncompahgre Plateau topographic unit, but is environmentally similar. The western boundary of the study area is formed by the San Miguel and the Dolores rivers.

The Uncompahgre Plateau is on the Colorado Plateau, not far from the Southern Rocky Mountains physiographic province (Fenneman 1931). Like much of the Colorado Plateau, the Uncompahgre Plateau is dominated by relatively high elevation and by extensive exposures of nearly horizontal beds of sedimentary rock. Precambrian metamorphic rocks and granites underlie the sedimentary formations. The sedimentary rocks, primarily composed of sandstone and shale, are primarily of Triassic and Jurassic age (Fenneman 1931). The Uncompahgre Plateau represents a massive uplift, towering nearly 1,525 m (5,000 ft) above the Uncompahgre River Valley. The uplift is oriented northwest to southeast and is highest at its southern end, where it approaches 3,048 m (10,000 ft). The western side of the plateau is drained by the San Miguel and Dolores rivers and their tributaries, and the eastern side is drained by the Gunnison and Uncompahgre rivers. Secondary drainages are oriented in a trellis fashion.

Vegetation in the study area is variable and is, in a general sense, associated with elevation. Microenvironmental settings vary with respect to aspect, soil depth, precipitation, and other factors, so variation is greater than suggested by the broad vegetation zones commonly used to describe the plateau. The broad vegetation zones are useful, however, for basic description. The crest of the plateau is within the Soil Conservation Service's (1972) Woodlands and Grasslands of Sub-Alpine Areas zone, which is dominated by stands of spruce and fir, lodgepole pine, and aspen. Parklands are often dominated by Thurber's fescue. This zone is surrounded by the Woodlands of the Lower Mountains zone, which is characterized by stands of ponderosa pine, Gambel oak, Douglas fir, blue spruce, white fir, and some aspen. Understory species include fescue, muhly, bluegrass, shrubs, and forbs. Lower on the flanks of the plateau is the Woodlands of the Intermountains zone. This zone is dominated by pinyon and juniper with wheatgrass, Indian ricegrass, bluegrass, shrubs, and forbs. The lowest elevations on the eastern side of the Uncompahgre Plateau are within the Shrublands of the Saltdeserts zone. Common plant species include saltbushes, rabbitbrush, galleta, Indian ricegrass, and greasewood.

The Uncompahgre Plateau is rich in game animals, in part because vegetation zones are compressed into relatively small horizontal distances as a result of rapid increases in elevation. Game can graze in the well-watered and lush highlands in the summer, then migrate relatively short distances down slope to more protected winter ranges. Mule deer are abundant in all areas except the lowest elevations, where antelope and desert bighorn are present, particularly along the Gunnison River valley. Elk are common. There is no historic evidence of bison on the Uncompahgre Plateau, though populations were present north of the Colorado River (Meaney and Van Vuren 1991). The Scrublands of the Saltdeserts support jackrabbit. Cottontail are common in the pinyon and juniper woodlands, and snowshoe hare are common in the highest elevations. Common predators included black bear, coyote, mountain lion, and bobcat. Grizzly bear and wolves probably once roamed the area (Burt and Grossenheider 1976). Trout occur in the colder mountain streams, and pikeminnow, chub, and suckers historically inhabited the warmer waters of the major rivers. Important game birds available to prehistoric peoples included blue grouse, wild turkey, and Gambel's quail.

Report Organization and Approach to Dating

This research design and context has seven primary subsequent sections. Chapter 2 is a compilation of existing site file and cultural resource inventory data. Excavated sites are also identified. The site file and literature search effort was conducted in the autumn of 2003; sites recorded and archaeological investigations completed since that time are not included. Chapter 3 discusses the research value of existing archaeological collections for sites excavated within the project area. A few radiocarbon samples were selected and processed as part of this effort; these results are included. Chapters 4, 5, 6, and 7 summarize our knowledge of broad archaeological units – namely, the Paleoindian, Archaic, Formative, and Protohistoric eras – and suggest future research

directions. Basic research objectives are summarized in Chapter 8. Chapter 8 also includes a discussion on the evaluation of site significance.

Much of this report's discussion of temporal issues is based on radiocarbon data. To make it easier to integrate Protohistoric-era and historical events, dates will be presented as A.D. or B.C., as opposed to B.P. (Before Present). Not all archaeologists and paleoecologists present their dates as A.D. or B.C., so conversions have been made for the sake of consistency. Whenever possible, radiocarbon determinations are calibrated, a method that takes into account temporal fluctuations in atmospheric ^{14}C. Through comparisons to dendrochronological data, calibrated date ranges are directly linked to calendar years. Calibrated dates are preceded by "cal" and reflect two standard deviations. In some cases, uncalibrated B.P. dates presented by other researchers are considered, often in the absence of raw radiocarbon determinations. In these cases, the B.P. dates are calibrated using the Calib 4.4.2 program (Stuiver and Reimer 2004). Where simple B.P. dates are presented, the dates are regarded as the radiocarbon age, and a standard error of either 200 years (for late Pleistocene and Paleoindian-era dates) or 100 years (for Archaic and later dates) is employed.

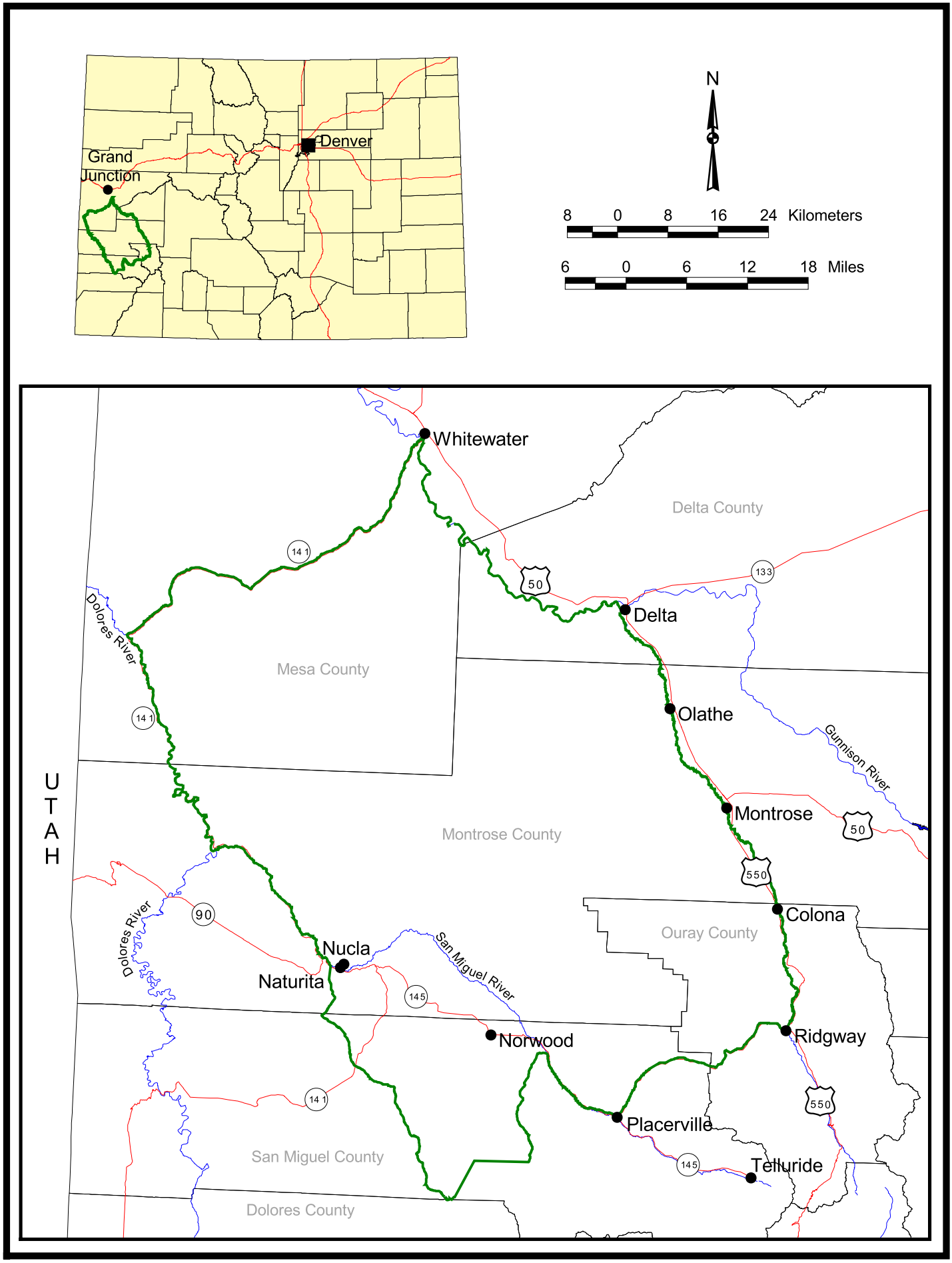


Figure 1. Location of the UPAP Study Area.

Chapter 2
Site File Search Results

Introduction

The overall goals of the Uncompahgre Plateau Archaeological Project (UPAP) include expansion of our understanding of the project area's prehistory through examination of existing archaeological data. Achievement of this objective will permit better evaluation and management of cultural resource sites on the Plateau, especially with regard to planned vegetation treatments. The data compilation phase is, therefore, a particularly important one, because the resulting data form the basis for the context and research design for the Uncompahgre Plateau and for the development of site sensitivity models. This section discusses the methods used in the data compilation effort and summarizes the cultural resource sites documented in the area. The cultural resource inventories and excavations that have occurred in the project area are also reviewed.

Methods

The archaeological data compilation effort consisted of four basic tasks. These included development of a database for the prehistoric and Protohistoric/historic aboriginal sites (henceforth referred to simply as "prehistoric sites"), inspection of historic and recent maps to identify American Indian trails, delineation of large areas intensively inspected for cultural resources, and identification of sites that have been subjected to controlled archaeological excavations.

Site Database

The project's site database was based on a computerized GIS database provided by the Office of Archaeology and Historic Preservation (OAHP) at the Colorado Historical Society. The database was filtered to include only prehistoric cultural resources. The OAHP database is relatively complete, as the regional land-managing agencies have been diligent in forwarding site records to the state in a timely manner, and because the OAHP has established the site database as a high priority. The OAHP database included isolated finds, which merit no management consideration and which substantially inflated the totals. These were identified and omitted.

Those portions of the OAHP site database specific to sites were converted by Alpine into an Access database to facilitate data manipulation. Other portions of the OAHP GIS database were used to generate USGS topographic quadrangles depicting site distributions. These maps were compared to the cultural resource base maps on file at the local land-managing agency offices. These offices included the Bureau of Land Management's (BLM) Uncompahgre Field Office in Montrose, the BLM Grand Junction Field Office in Grand Junction, the BLM San Juan Resource Area Office in Dolores, and the Grand Mesa, Uncompahgre, and Gunnison Forest Service Supervisor's Office in Delta, Colorado. Because of the volume of sites involved, Alpine personnel attempted to identify clusters of sites that seemed to have not been included in the OAHP database. Such clusters usually indicated recently completed projects in which the sites had yet to be entered into the OAHP database. Individual sites seemingly omitted from the OAHP database were usually ignored, because of the high likelihood that they were historic, and were, therefore, intentionally omitted from the database. In any case, the sample of prehistoric sites in the OAHP database is sufficiently large that inadvertent omission of a few sites will have no significant effect on project results. Site records for the prehistoric sites not in the OAHP database were procured so that the data could be entered into Alpine's site database and so that site locations could be plotted on site distribution maps.

In addition to the database described above, a small database for "potential" sites was developed so that important, but not formally recorded could be considered. These site types mostly include circular stone structures, wickiups, and tree platforms that were described by Betty and

Harold Huscher during their expedition to the Uncompahgre Plateau in 1939. Potential sites are not included in site tallies, but will comprise a GIS layer for site sensitivity modeling. In the late 1970s, BLM archaeologist Douglas Scott was able to determine the approximate location of many of the Huscher's sites that were on the Uncompahgre Plateau. Although Scott may have actually revisited some, the approximate locations of many were determined through a careful reading of the Huscher's field notes (Huscher and Huscher 1939).

The unrecorded potential sites have herein been designated "Huscher," followed by the page number that the site is described in the Huscher's field notes. Site locations should be regarded as approximations only; they were plotted in the center of the legal location unit indicated by Scott, and are probably misplotted to varying extents.

Historic Map Inspection

Historic-period Indian trails in the project area were identified through inspection of General Land Office (GLO) maps on file at the BLM offices in Montrose and Grand Junction. The GLO maps generally date to the 1880s and 1890s, so map indications of Indian trails may be fairly accurate. Recent USGS topographic quadrangles were also inspected for Indian trails, because some trails are so designated. The credibility of the USGS designations may be less than that of the GLO data.

Delineation of Areas Intensively Inventoried

The development of site sensitivity models will require assessment of site densities and an understanding of the environmental and topographic situations where sites do and do not occur. It is necessary, therefore, to map areas within the project area that have been intensively inspected for cultural resources, regardless of inventory results. An emphasis was placed on inventory projects that covered a relatively large area. The larger survey tracts were believed to yield more information about site distributions, because they included more variation in environmental and topographic setting than small inventory tracts. Focusing on the larger projects also reduced the volume of inventory areas to a more manageable number. For this effort, inventories covering 40 acres or more were included. In the case of linear projects, survey corridors 4 miles (6.4 km) or longer were included. If those corridors were 100 ft (30 m) wide, a 4-mile-long corridor would include approximately 48 acres.

Data regarding the areas previously inspected for cultural resources were derived from two sources. Some data were embedded in the GIS database supplied by the OAHP, as discussed above. The OAHP database was incomplete in its depiction of inventoried areas, however, because of its present emphasis on inputting site location data. Much of survey area data were collected at the local BLM and Forest Service offices, where survey area atlases are maintained. Large survey areas were drawn on a set of Alpine maps. The transfer of survey area data from agency maps was done by hand, which introduced a small degree of error. This error, however, should not significantly skew the data, and should still provide a fairly accurate indication of the area and extent inventoried.

During the data compilation effort at the Forest Service, it was noted that the areas marked as inventoried often depicted the extent of project areas, such as timber sales, rather then the extent of intensive, Class III inventory. Within the heavily vegetated forests, inventories are often not intensive. Areas such as meadows or disturbed areas, such as roads, are often subjected to intensive inspection, but heavily forested or sloping areas are often not inspected, or cursorily inspected. In other cases, all portions of the project area were subjected to a systematic sampling scheme, where randomly selected transects were intensively inventoried. Because projections of site distributions must be based on areas inspected at roughly equivalent levels, it was necessary to inspect each inventory report at the Forest Service to discern the intensity of the inventory. Only areas intensively inspected for cultural resources were plotted on project maps by Alpine. The areas

subjected to intensive cultural resource inventory have been digitized and entered into a GIS program for analyses and display.

Identification of Previous Archaeological Excavations

Because excavated sites usually impact regional archaeological interpretations to a greater degree than unexcavated sites, an effort was made to identify those sites subjected to substantial excavations. Excavated sites were also identified because one of the project's objectives is to determine whether curated collections contain materials whose analysis would greatly contribute to interpretation of the project area's prehistory. Sites minimally excavated, as in a testing program, were not considered. Excavated sites were identified through a review of regional literature and through use of the OAHP "Compass" database, which can be queried for excavated sites under the "condition" variable.

Previous Archaeological Work

Archaeological Excavations

As indicated in Table 1, a considerable number of sites within the project area have been subjected to controlled archaeological excavations. Seventy-three sites have been excavated to a level greater than site testing, recovery of features during archaeological monitoring, or recovery of human burials (e.g., Eckman et al. 2001; Sullivan 1998; Stiger 2001a).

The earliest professional excavations in the project area commenced in the late 1930s by Betty and Harold Huscher of the Colorado Museum of Natural History, C. T. Hurst of Western State College, and H. Marie Wormington, also of the Colorado Museum of Natural History. The Huschers focused their research on prehistoric architectural sites in west-central Colorado. These sites commonly had circular masonry structures, some Anasazi pottery and, occasionally, corn macrofossils. They excavated eight sites in the project area and a number of sites elsewhere in the region. The Huschers concluded that the masonry architectural sites represented the remains of Athapaskan immigrants en route to their historic homelands in the Southwest (Huscher and Huscher 1943).

Meanwhile, C. T. Hurst began nearly a decade of excavation at rockshelter sites and sites with architecture reminiscent of Puebloan habitations in western Montrose County. The rockshelter sites, such as Tabeguache Caves I and II and Cottonwood Cave, yielded corn and other items that indicated a Basketmaker II-like occupation. Recent chronometric dates from these sites confirm early Formative-era occupations (Stiger 2001b). The architectural sites, namely, Cottonwood and Tabeguache Pueblos, included rectangular masonry rooms and Anasazi pottery. Ceramic cross-dating indicated that these sites were occupied more recently than the primary occupations at the cave sites – probably between A.D. 900 and 1050.

H. Marie Wormington excavated the Casebier and Moore sites southwest of Delta, Colorado, in 1938 and 1939. These were both rockshelter sites that had been discovered by local amateur archaeologists. The resulting data were combined with data from the nearby Taylor Site to serve as the basis for Wormington's dissertation (see Wormington and Lister 1956). In the early 1950s, the Denver Museum of Natural History and the University of Colorado collaborated on a second phase of excavations, focusing on sites northwest of the UPAP area. Data from the two phases of investigation provided the basis for the definition of the Uncompahgre Complex (Wormington and Lister 1956). The Uncompahgre complex was thought to represent a localized variant of Jenning's (1953) Desert Culture. Artifact types thought to be unique to the Uncompahgre complex included "Uncompahgre Scrapers," adze-like scrapers, and polished and shaped stone spalls (Wormington and Lister 1956).

Academic interest in the region's prehistoric record continued in the early 1960s with the initiation of the Ute Prehistory Project. This project was conducted by the University of Colorado, under the overall direction of Robert Lister. William Buckles was in direct charge of the project. Buckles and his associates investigated 17 rock art sites and excavated 39 sites on the eastern flank of the Uncompahgre Plateau. Thirty-six of the sites are listed in Table 1. Buckles' resulting dissertation included an extensive analysis of the region's rock art and prehistoric artifacts (Buckles 1971). Although few chronometric dates were obtained, a phase sequence was developed for the region's archaeology. The overall objective of tracing Ute prehistory was not realized. However, the Uncompahgre complex, as originally defined by Wormington and Lister (1956), was refined. The artifact types purported by Wormington and Lister (1956) as diagnostic of the complex were found to not be unique to the region. Buckles's dissertation has had a major impact on the region's archaeology, in part because of the huge volume of data presented, but also because of the thoroughness of his research and the thoughtfulness of its interpretations.

The Chipeta Chapter of the Colorado Archaeological Society conducted excavations at the multicomponent Harris site (5MN2341) in the mid-1980s. These excavations were conducted in response to ongoing vandalism at the site.

Most of the excavation projects that followed the Ute Prehistory Project have been conducted in response to Section 106 of the National Historic Preservation Act of 1966 (as amended). The Bureau of Reclamation contracted with ESCA-Tech Corporation to conduct archaeological mitigation on the Dallas Creek Project, which is now manifest as Ridgway Reservoir. William Buckles of the University of Southern Colorado was hired to conduct the archaeological work. Five prehistoric sites were excavated that occur within the UPAP project area (Muceus and Lawrence 1986). The largest of the compliance projects, however, was the TransColorado natural gas pipeline project, conducted by Alpine Archaeological Consultants, Inc., and its subcontractor, Centennial Archaeology, Inc. Ten prehistoric sites in the UPAP project area were excavated. Excavations were often extensive, and a great number of artifacts, radiocarbon, and other ancillary study specimens were analyzed (Reed 2001). A synthetic volume was produced that integrated all the sites investigated along the 300-mile-long pipeline route.

Cultural Resource Inventories

State and federal agency files indicate that a large number of cultural resource inventories have been conducted within the UPAP project area. As discussed above in the section on Class I inventory methods, data were recorded only for project areas exceeding approximately 40 acres in size and for projects where areas intensively inspected for cultural resources were reported. This left out some of the oldest inventories, which are no longer regarded as intensive. A total of 160 cultural resource inventories met these criteria and are herein considered. An estimated 69,922 acres within blocks in the UPAP project area have been subjected to intensive cultural resource inventory. Additionally, approximately 472 miles of linear projects have been inventoried. In all, approximately 75,633 acres have been intensively inspected by qualifying inventories, representing approximately 4.6 percent of the project area.

Most of the subject cultural resource inventories were conducted to comply with Section 106 of the National Historic Preservation Act of 1966. Some are linear in nature and represent work conducted in advance of seismic operations and construction of power and telephone transmission lines, roads, and pipelines (Table 2). Most inventories, however, are comprised of blocks. These include planned land exchanges, coal leases, firewood cutting areas, timber sales, reservoir pool areas, small-scale water developments, vegetation treatments, grazing allotments, and oil and gas wells. Surveys for vegetation treatments (e.g., controlled burning, roller chopping, etc.) are increasingly common. Timber sales are most common on lands administered by the Forest Service.

Table 1. Excavated Sites in the Uncompahgre Plateau Archaeological Project Area.

Site No.	Site Name	Type	Major Components	Reference
	HH	Structural	Formative	Huscher and Huscher 1943
	HMF-1	Structural	Formative	Huscher and Huscher 1943
	HMF-2	Structural	Formative	Huscher and Huscher 1943
	HMF-3	Structural	Formative	Huscher and Huscher 1943
	HMF-4	Structural	Formative	Huscher and Huscher 1943
	HSP	Structural	Formative	Huscher and Huscher 1943
	HBL	Structural	Formative	Huscher and Huscher 1943
5DT0002	Christmas Rockshelter	Rockshelter	Paleoindian, Archaic, Formative	Buckles 1971
5ME0001		Rock Art and Artifacts	Unknown	State site files
5MN0002	Hauser Site	Rockshelter	Protohistoric, Formative, Archaic	Buckles 1971; Lister and Sanburg 1963
5MN0004		Rockshelter	Unknown	Buckles 1971
5MN0006	Frank's Shelter	Rockshelter	Formative	Buckles 1971
5MN0009		Rockshelter	Formative	Buckles 1971
5MN0010		Rockshelter	Late Prehistoric	Buckles 1971
5MN0012		Rockshelter	Archaic, Formative	Buckles 1971
5MN0013	McMillen Site	Open Artifact Scatter	Protohistoric	Buckles 1971
5MN0014	Carlyle Shelter	Rockshelter	Formative, Protohistoric	Buckles 1971
5MN0015	Juanita's Shelter	Rockshelter	Archaic	Buckles 1971
5MN0017	Initial Site	Open Artifact Scatter	Formative	Buckles 1971
5MN0018		Rockshelter	Protohistoric	Buckles 1971
5MN0020		Rockshelter	Archaic, Formative	Buckles 1971
5MN0025		Rockshelter	Unknown	Buckles 1971
5MN0027	Shavano Picture Rock	Open Artifact Scatter	Formative	Buckles 1971
5MN0028	Shirley's Shelter	Rockshelter	Formative	Buckles 1971
5MN0030	Monte's Shelter	Rockshelter	Formative	Buckles 1971
5MN0033	Cushman Creek Site	Open Artifact Scatter	Unknown	Buckles 1971
5MN0034	Squint Site	Open Artifact Scatter	Formative	Buckles 1971
5MN0035	Bedrock Pit Site	Open Artifact Scatter	Formative, Protohistoric	Buckles 1971
5MN0036		Rockshelter	Unknown	Buckles 1971
5MN0037		Rockshelter	Unknown	Buckles 1971
5MN0038	Childer's Site	Open Artifact Scatter	Formative	Buckles 1971
5MN0040	Shavano Springs Site	Open Artifact Scatter	Archaic, Formative, Protohistoric	Buckles 1971
5MN0041	Lee Ranch Wickiup	Wickiup	Protohistoric	Buckles 1971
5MN0042		Wickiup	Protohistoric	Buckles 1971
5MN0043	Sanburg Site	Rockshelter	Archaic	Buckles 1971
5MN0044	Monitor Creek Wickiup	Wickiup	Protohistoric	Buckles 1971
5MN0051		Rockshelter	Formative	Buckles 1971
5MN0055	Roubideau Rim Site	Open Artifact Scatter	Formative	Buckles 1971

Table 1. Excavated Sites in the Uncompahgre Plateau Archaeological Project Area.

Site No.	Site Name	Type	Major Components	Reference
5MN0057	Frank Bond Site	Open Artifact Scatter	Formative	Buckles 1971
5MN0058	Caddy Site	Open Artifact Scatter	Unknown	Buckles 1971
5MN0061		Rockshelter	Formative	Buckles 1971
5MN0062		Rockshelter	Formative	Buckles 1971
5MN0063		Rockshelter	Unknown	Buckles 1971
5MN0065		Wickiup	Protohistoric	Buckles 1971
5MN0368	Weimer Ranch	Structural	Formative	Crane 1977
5MN0517	Hill I	Structural	Formative	Crane 1977
5MN0519	Cottonwood Cave	Rockshelter	Formative	Hurst 1948a
5MN652	Middle Hill, Weimer Ranch	Structural	Formative	Crane 1977
5MN0653	Wagon Bend, Weimer Ranch	Structural	Formative	Crane 1977
5MN654	Cottonwood Pueblo	Structural	Formative	Hurst 1948b; Crane 1977
5MN0863	Moore Site	Rockshelter	Formative and Archaic	Wormington and Lister 1956
5MN0864	Casebier Site	Rockshelter	Formative and Archaic	Wormington and Lister 1956
5MN0868	Tabeguache Cave	Rockshelter	Formative	Hurst 1940, 1941
5MN0890	Tabeguache Cave II	Rockshelter	Formative	Hurst 1943, 1944
5MN1609	Tabeguache Pueblo	Structural	Formative	Hurst 1946
5MN2341	Harris Site	Rockshelter	Archaic and Protohistoric	Tucker and CAS 1989
5MN2628	Oak Hill Site	Open Artifact Scatter	Formative, Protohistoric	Cater 2001
5MN3462	Jeff Lick Site (HJL)	Structural	Formative	Huscher and Huscher 1943
5MN3760		Open Artifact Scatter	Formative	Conner and Hutchins 1991
5MN3859	Coalbank Canyon Site	Open Artifact Scatter	Archaic, Formative	Kalasz et al. 2001
5MN3861		Open Artifact Scatter	Archaic, Protohistoric	Slessman and Davies 2001
5MN3876	Transfer Road Hamlet	Structural	Formative	Kalasz et al. 2001
5MN4082		Open Artifact Scatter	Archaic, Formative, Protohistoric	Slessman et al. 2001
5MN4253	Schmidt Site	Wickiup, Structural	Formative, Protohistoric	Greubel and Cater 2001
5MN4270	Aldasoro Site	Open Artifact Scatter	Protohistoric	Greubel and Reed 2001a
5OR179		Lithic Scatter	Formative	Muceus and Lawrence 1986
5OR182		Lithic Scatter	Formative	Muceus and Lawrence 1986
5OR198		Lithic Scatter	Formative	Muceus and Lawrence 1986
5OR243		Lithic Scatter	Formative	Muceus and Lawrence 1986
5OR317		Lithic Scatter	Archaic	Muceus and Lawrence 1986
5SM2423	Broken Leg Site	Open Artifact Scatter	Paleoindian, Formative	Firor 2001
5SM2425	Simpson Wickiup Site	Wickiup	Archaic, Formative, Protohistoric	Greubel 2001
5SM2478	Harvey Site	Open Artifact Scatter	Archaic	Greubel and Reed 2001b
5SM2578	Fallen Deer Site	Open Artifact Scatter	Formative	McDonald 1998

Table 2. Large Class III Inventories in the Project Area.

Project Type	Project Name	Lead Federal Agency*	Report Reference	Block Acres	Linear Miles
Coal Lease	Nucla Coal Lease	BLM	Baker 1978	1258	
Firewood Cutting	Tenderfoot Mesa/ Bull Hill Commercial Firewood Cutting Area	BLM	O'Neil 1996	530	
Firewood Cutting	Lee Point Woodcutting Area	BLM	Scott 1981	103	
Firewood Cutting	Woodcutting Area Northeast of Norwood	BLM	Steel 1979j	261	
Firewood Cutting	Firewood Cutting along Lilylands Canal	BLM	Steel 1979l	528	
Firewood Cutting	Firewood Cutting Area	BLM	Steel 1979m	175	
Firewood Cutting	Woodcutting Area Adjacent to Davewood Road	BLM	Steel 1979n	137	
Firewood Cutting	Lee Point Wood Sales	BLM	Steel 1980c	112	
Firewood Cutting	Government Springs Woodcutting Area	BLM	Steel 1980d	232	
Grazing	Hank's Valley Diversity Unit	FS	Crum 1998	57	
Grazing	Dominguez Allotment #14001	BLM	Lazorchak 2002	262	
Land Exchange	Uncompahgre Basin Land Exchange	BLM	Baker 1996	618	
Land Exchange	Uncompahgre Basin Sale Tracts	BLM	Davis 1984	171	
Land Exchange	Thomas Exchange	BLM	Euler 1977	477	
Land Exchange	Bray Exchange	BLM	Fike 1994a	89	
Land Exchange	Carstens Exchange Area 1	BLM	Fike and Lujan 1989	62	
Land Exchange	Carstens Exchange	FS	Harden et al. 1996	1015	
Land Exchange	Naturita Sale Tracts	BLM	Rupp 1983	146	
Land Exchange	Uncompahgre Basin Sales Tract No. 8	BLM	Rupp 1984a	44	
Land Exchange	Uncompahgre Basin Sales Tract	BLM	Rupp 1984c	42	
Land Exchange	Uncompahgre Basin Sales Tract, Voth Trespass	BLM	Rupp 1984d	55	
Mine Reclamation	Naturita UMTRA Project	DOE	Hammack 1989	173	
Mine Reclamation	Naturita UMTRA Project	DOE	Hammack 1990	484	
Miscellaneous	McGarvey Farm	BLM	Baker 1990	188	
Miscellaneous	Calhoun PSA	BLM	Breternitz 1975a	51	
Miscellaneous	Musser PSA	BLM	Breternitz 1975b	59	
Miscellaneous	Uncompahgre Valley Hydropower Project	FERC	Chandler 1986		8.27
Miscellaneous	Community Rock Quarry	BLM	Crouch 1978b	186	
Miscellaneous	Big Dominguez Creek Wildlife Project	FS	Crum 1993b	323	
Miscellaneous	Camelback Inventory Continuation	BLM	Fike 1994b	131	
Miscellaneous	Proctor Moss Rock Area	BLM	Fike 1997	65	
Miscellaneous	San Miguel Resource Area	BLM	Gleichman and Legard 1977	638	
Miscellaneous	Camelback Inventory Continuation	BLM	Grand River Institute 1996	2290	
Miscellaneous	ARMA Geophysical Company	BLM	Hibbets 1988		3.99

Table 2. Large Class III Inventories in the Project Area.

Project Type	Project Name	Lead Federal Agency*	Report Reference	Block Acres	Linear Miles
Miscellaneous	Guzzler Construction on Public Lands	BLM	Hull 1975	41	
Miscellaneous	Bureau of Reclamation Drill Holes	BLM	Hull 1977c	324	
Miscellaneous	Dry Creek Enduro Race	BLM	Jenkins 1998	1925	
Miscellaneous	Spring Creek Mesa	BLM	Klesert and Webster 1981	2378	
Miscellaneous	Nucla-Naturita Telephone Company Proposed Buried Cable Route	BLM	Kvamme 1979		8.35
Miscellaneous	Predictive Site Location Models	BLM	Kvamme 1983	1507	
Miscellaneous	Uncompahgre Environmental Statement	BLM	Martin 1977	69	
Miscellaneous	Shavano Valley, Soil Conservation	SCS	Reed 1984	131	
Miscellaneous	Uncompahgre Basin Resource Area	BLM	Robinson 1988	306	
Miscellaneous	Lower Horsefly Resv.	BLM	Rupp and Scott 1983	49	
Miscellaneous	Roatcap Boundary Fence	BLM	Rupp 1984e	136	
Miscellaneous	Ute Wickiups or Navajo Forked-Stick Hogans	NA	Sanfilippo 1998	44	
Miscellaneous	Stock Ponds and Livestock Fence	BLM	Scott 1977a	245	3.8
Miscellaneous	Union Carbide TV Reflector	BLM	Scott 1979b		3.0
Miscellaneous	Fenceline Northwest of Minnesota Creek	BLM	Steel 1978a		3.91
Miscellaneous	Chaining West of Dave Wood Road	BLM	Steel 1978d	110	
Miscellaneous	Log Hill Mesa	BLM	Steel 1979b	511	
Miscellaneous	Moss Rock Collection Areas 17, 18, and 19	BLM	Steel 1979f	352	
Miscellaneous	West Fork of Dry Creek Woodcutting Area	BLM	Steel 1979g	274	
Miscellaneous	Narrows Catchment	BLM	Steel 1980a	54	
Miscellaneous	Little Mesa Catchment and Access Road	BLM	Steel 1980b	40	
Miscellaneous	Ten 40-acre Tracts to be Placer Mined	BLM	Steel 1981b	408	5.0
Miscellaneous	Nucla Gravel Pit	BLM	Tickner 1998	41	
Miscellaneous	San Miguel River from Cottonwood Creek to Norwood Hill	BLM	Toll 1975	775	
Pipeline	Trans-Colorado Gas Pipeline	BLM	Applegarth 1977	82	1.74
Pipeline	Cabot's Sawtooth Pipeline	BLM	Firor 2002		10.16
Pipeline	Trans-Colorado Gas Pipeline	BLM	Reed 2001		21.17
Pipeline	Pipeline on Dry Mesa	BLM	Steel 1978c		3.89
Roads	Mailbox Park Road Maintenance	BLM	Fike 2000b		6.01
Roads	Divide Road Improvements	FS	Gordon 1975		5.26
Roads	TransColorado Gas Pipeline Rights-of-Way	FERC	Pfertsh 1999	38	36.1
Roads	TransColorado Gas Pipeline Access Roads	FERC	Pfertsh and Reed 1998		11.1
Roads	Road and Rip Rap Collection	BLM	Steel 1979e	651	
Roads	Long Mesa Local Road #4958	BLM	Tickner 1999		4.96
Seismic Lines	New Frontier NWD1-3	BLM	Cavanaugh 1990		16.67

Table 2. Large Class III Inventories in the Project Area.

Project Type	Project Name	Lead Federal Agency*	Report Reference	Block Acres	Linear Miles
Seismic Lines	Western Geophysical's Seismic Studies at Bedrock and Uravan	BLM	Copeland 1977	285	
Seismic Lines	Shell Oil Seismic Lines, Montrose and San Miguel Counties	BLM	Copeland 1978a		32.96
Seismic Lines	Shell Oil Seismic Lines 464-78-03	BLM	Copeland 1978b		4.70
Seismic Lines	Fourteen Shell Oil Seismic Lines	BLM	Copeland 1979a		4.31
Seismic Lines	Eleven Shell Oil Seismic Lines	BLM	Copeland 1980	43	7.49
Seismic Lines	Western Geophysical's Seismic Lines	BLM	Copeland 1982		14.98
Seismic Lines	Shell Western E & P Paradox Basin Seismic Line	BLM	DeChambre 1988		9.58
Seismic Lines	ARMA Geophysical's Seismograph Line NAT-1	BLM	DeFrancia 1987		1.02
Seismic Lines	Grant Geophysical's Paradox Basin Seismic Testing Line 8	BLM	Ebel 1983		2.36
Seismic Lines	Seismic Prospecting	FS	Gobber 1980		5.53
Seismic Lines	Seismic Prospect Lines 4, 6, 9, and 12	FS	Gobber 1981		3.83
Seismic Lines	Seis Pros, Inc.'s Seismographic Line TAB-1 (SE Portion)	BLM	Harden 1988		2.05
Seismic Lines	Survey of a Seismic Line in Mesa County	BLM	Lee 1981		6.07
Seismic Lines	Shell Oil Seismic Line 80-266-111-STA 837-STA1035	FS	Reed 1980		3.76
Seismic Lines	Norpac Seismic Lines 1-6	FS	Rolen 1984		23.43
Telephone Lines	Highway 161	BLM	Copeland 1979b		3.75
Telephone Lines	118 Miles of Nucla-Naturita Co. Buried Cable	BLM	Kvamme 1979		8.35
Timber Sale	Kitty Creek Timber Sale	FS	Barclay 1992b	664	5.54
Timber Sale	Smokehouse North Salvage Timber Sale	FS	Bashore 1991	82	17.0
Timber Sale	Points Creek Timber Sale	FS	Brown 1990	749	
Timber Sale	Ute-Pine Ridge Timber Sale	FS	Cassells et al. 1979	1303	
Timber Sale	Columbine Timber Sale	FS	Lischka 1979	3547	
Timber Sale	Calamity Timber Sale	FS	Crum 1992	222	
Timber Sale	Barclay Draw Timber Sale	FS	Crum 1993a	521	
Timber Sale	Upper Bench Timber Sale	FS	Crum 1995	728	
Timber Sale	Campbell Point Timber Sale	FS	Crum 1996	709	
Timber Sale	North Love Mesa, Motherlode, Socks, and Dan Timber Sale	FS	Currit 1992a	1185	8.32
Timber Sale	Monitor Timber Sale	FS	Currit 1992b	116	8.34
Timber Sale	Ouray Springs/Darling Aspen Timber Sale	FS	Currit 1994a	468	
Timber Sale	Section 19 Timber Sale	FS	Greubel 1987a	394	

Table 2. Large Class III Inventories in the Project Area.

Project Type	Project Name	Lead Federal Agency*	Report Reference	Block Acres	Linear Miles
Timber Sale	Long Creek Timber Sale	FS	Greubel 1987b	222	5.89
Timber Sale	West Fork Timber Sale	FS	Greubel 1988	333	3.72
Timber Sale	Clear Creek No. 2 Timber Sale	FS	Greubel 1989	1987	
Timber Sale	Ed Joe Draw Timber Sale and West Naturita Creek Fish Habitat Improvement	FS	Greubel 1991	1923	
Timber Sale	Grave Marker and Tumble Bug Timber Sales	FS	Greubel and Andrews 1989	68	
Timber Sale	Columbine West Timber Sale	FS	Greubel and Hammer 1989	307	13.13
Timber Sale	Busted Arm and Bull Pond Timber Sales	FS	Greubel et al. 1991	742	
Timber Sale	Goshorn Draw #2 Timber Sale	FS	Johnson 1977	2100	
Timber Sale	Braimer, Cartwheel, and Hank's Creek Timber Sales	FS	Martorano and Mutaw	41	12.78
Timber Sale	Four Timber Sales	FS	Martorano et al. 1982	61	
Timber Sale	47 Creek Timber Sale	FS	Martorano et al. 1985	188	9.27
Timber Sale	Cottonwood/Dillard Timber Sales	FS	Martorano et al. 1987	39	15.02
Timber Sale	Telephone Salvage Timber Sale	FS	McKeever 1996	327	
Timber Sale	Horsefly Creek Burn and Patterson Timber Sales	FS	Painter et al. 1993	2899	
Timber Sale	Little Red Timber Sale	FS	Popelish et al. 1980	55	
Timber Sale	Horsefly Canyon Timber Sale	FS	Popelish et al. 1980	548	
Timber Sale	Lockhart Timber Sale	FS	Ryan and Nickens 1978	860	
Timber Sale	Brushy Ridge Timber Sale	BLM	Steel 1978b	241	
Timber Sale	Between Burn Canyon and McKee Draw Timber Sale	BLM	Steel 1979i	303	
Timber Sale	Burn Canyon Timber Salvage	FS	Stipe 2002	2428	
Timber Sale	Hanks Creek Timber Sale	FS	Tate and Martorano 1991	187	
Timber Sale	South Divide Timber Sale	FS	Nykamp and Hammer 1982	3023	
Transmission Line	Rifle-San Juan Project	WAPA	Chandler and Einninger 1982	110	9.0
Transmission Line	Nucla to Naturita Rebuild	BLM	Firor 1996		1.58
Transmission Line	Rifle-San Juan Project	WAPA	Howell et al. 1984	56	8.3
Transmission Line	Rifle-San Juan Project	WAPA	McDonald 1986		27.50
Transmission Line	Rifle-San Juan Project	WAPA	McDonald 1987		6.92
Transmission Line	Rifle-San Juan Project	WAPA	McDonald and Horn 1986		16.80
Transmission Line	Rifle-San Juan Project	WAPA	McDonald and Horn 1986		5.36

Table 2. Large Class III Inventories in the Project Area.

Project Type	Project Name	Lead Federal Agency*	Report Reference	Block Acres	Linear Miles
Transmission Line	Nucla-Telluride Transmission Line	FS	Pfertsh 1999	44	
Vegetation Treatment	Coke Ovens Sagebrush Treatment Area	BLM	Conner and Davenport 2000a	175	
Vegetation Treatment	Pine Mountain Prescribed Burn	FS	Crum 1997	127	
Vegetation Treatment	Maverick Prescribed Burn	FS	Crum 1999	59	
Vegetation Treatment	Moon Basin Rollerchop	BLM	Fike 1998	189	
Vegetation Treatment	Mailbox Park Rollerchop	BLM	Fike 1999	70	4.13
Vegetation Treatment	Moon Basin Rollerchop and Seed	BLM	Fike 2000a	126	
Vegetation Treatment	Wickson Draw Rollerchop Project	BLM	Fike 2000c	411	
Vegetation Treatment	Sage Grouse Roller Chop	BLM	Fike 2002	1176	
Vegetation Treatment	Cottonwood Draw Burn	FS	Forest Service 1978	274	
Vegetation Treatment	Middle Point Aspen Treatment	FS	Forest Service 1985	1019	
Vegetation Treatment	Cottonwood Roller Chop	FS	Gobber 1980	183	
Vegetation Treatment	Rollerchops and Controlled Burn, Southwest Colorado	FS	Green et al. 2002	168	
Vegetation Treatment	Red Canyon Aspen Treatment	FS	Hammer 1984a	2435	
Vegetation Treatment	Lower Horsefly Vegetative Manipulation	BLM	Harrison 1981	42	
Vegetation Treatment	Lower Horsefly Vegetative Manipulation	BLM	Harrison 1982b	1026	
Vegetation Treatment	Happy Canyon Chain and Seed	BLM	Harrison 1982a	481	
Vegetation Treatment	Burn Canyon Vegetation Treatment Area	BLM	Martin et al. 2003	2546	
Vegetation Treatment	Pine Mesa Burn	FS	McKeever 1995	98	0.85
Vegetation Treatment	Bucktail Burn	FS	McKeever 1997	711	
Vegetation Treatment	Pryor Creek Aspen Treatment	FS	Niles et al. 1986	1631	
Vegetation Treatment	Maverick Prescribed Burn	BLM	O'Neil 1998	232	
Vegetation Treatment	Gibbler II Vegetation Treatment Areas	BLM	Piontkowski 2003	894	
Vegetation Treatment	Log Hill Thinning	BLM	Steel 1979a	1245	
Vegetation Treatment	Highway 90 Plow and Seed	BLM	Steel 1979c	112	
Vegetation Treatment	Dry Creek Interseeding	BLM	Steel 1979d	65	
Vegetation Treatment	Dry Creek Basin Chaining Area to be Burned	BLM	Steel 1979h	298	
Vegetation Treatment	Cushner Burn	BLM	Steel 1980f	154	
Vegetation Treatment	Government Springs Roller-Chop	BLM	Steel 1981a	485	
Vegetation Treatment	Monitor Mesa Prescribed Burn	BLM	Tickner 1997		4.96
Vegetation Treatment	Goodenough Reforestation Impact Area	FS	Webster 1981	1419	
Vegetation Treatment	Dominguez Ridge Burn Impact Area	FS	Webster 1981a	510	

* BLM is Bureau of Land Management; FS is Forest Service; FERC is Federal Energy Regulatory Commission; WAPA is Western Area Power Administration; NA is Not Applicable.

American Indian Trails

A search of the Government Land Office (GLO) maps was conducted at the BLM offices in Montrose and Grand Junction, Colorado. The search resulted in the identification of three Indian trails. One additional Indian trail was located on the USGS 1:24,000 quad maps, and one trail has a site number. The following trails were identified within the Uncompahgre Plateau Archaeological Project boundary.

Wrights Mesa Indian Trail

The Wrights Mesa Indian Trail, identified from the GLO records, is approximately 8 km (5 miles) long and runs northwest to southeast of the town of Norwood, Colorado. The trail takes a relatively straight path across the mesa above Naturita Canyon.

Indian Creek Indian Trail

The Indian Creek Trail is a short trail, roughly 250 m (800 ft) long, which runs along a steep slope less than ½ mile south of Indian Creek. The slope is just north of Outlaw Mesa. This trail was identified from the GLO records.

Horsefly Creek Indian Trail

The Horsefly Indian Creek Trail is roughly 8 km (5 miles) long and parallels the North Fork and the West Fork of Horsefly Creek. The north end of the trail terminates around Government Springs. The trail was identified from the GLO records.

Forty-Seven Creek Indian Trail

Roughly 11 km long (7 miles), the south end of the Forty-Seven Creek Indian Trail begins on top of Pinto Mesa and goes down the steep slope to 47 Creek, which it follows for roughly 3.5 km (2.2 miles) before turning northeast toward Starvation Point. The trail was identified from the 1:24,000 scale USGS topographic quads (Nucla, Colo., Windy Point, Colo., and Starvation Point, Colo.). At the North Fork of the Tabeguache Creek, this trail becomes a "pack" trail. It is unclear where the Indian trail ends.

Shavano Valley Rock Art Site Trail

This trail is associated with the Shavano Valley Rock Art Site (5MN5) on the northeast slope of Shavano Valley west of the town of Montrose, Colorado. The trail runs roughly 200 m (700 ft) downslope at the north end of the site, just east of rock art panel 7.

5ME504 Trail

The trail recorded as site 5ME504 runs along Blue Creek, just north of Blue Mesa in the northeast part of the project area. The length of this trail is unknown.

Site Types and Frequencies

As of June 2003, 3,000 prehistoric and Protohistoric-era aboriginal sites had been recorded in the project area. Data from these sites have been entered into a project database. Much of the data were provided by the OAHP, but some was input directly from site records obtained from local land-managing agencies. Some site variables, such as site type and cultural affiliation, were reclassified, because of the high degree of idiosyncratic variation among site recorders. The reader should keep in mind that most of the site variables were derived without benefit of archaeological excavation. As a result, some variables, such as site age or archaeological unit affiliation, should be regarded as rough estimates. The original data also included much variation in site typologies. Commonly, a combination of both descriptive and functional site types was used. Because the variables that

provide insight into the function of a site, such as the presence or absence of hearths, can often only be determined through excavation, this project has employed only descriptive site types. Sites classified by some as camps, therefore, have been reclassified as artifact scatters.

Figure 2 presents the frequencies and percentages of site types within the project area. It should be noted that the quantity of site types exceeds the total number of sites in the project area. This is because forcing some sites into a single type obscures information important to this project's research objectives. For example, a large lithic scatter might include a rock art panel and a human burial. Because one of this project's objectives is to develop site sensitivity maps for various types of cultural resources, possibly including human burials or rock art, the site used as an example is classified as an open artifact scatter, a rock art site, and as a burial site. In some cases, site records indicated multiple functional categories, such as "open lithic scatter and sheltered architectural site." In these cases, we reclassified the sites into the more important category in the context of planned research (i.e., as a sheltered architectural site).

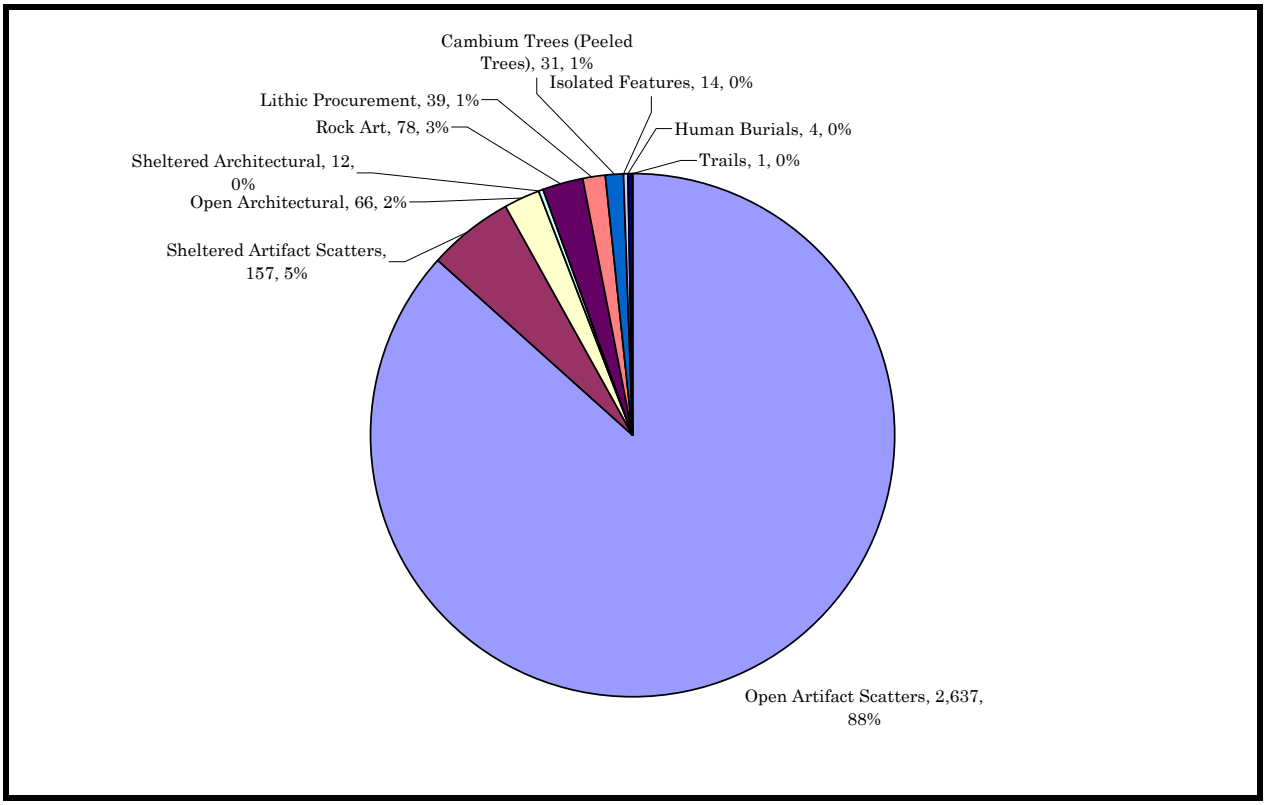


Figure 2. Relative frequencies of major site types.

Open Artifact Scatters

Open artifact scatters are the most common site type in the project area, comprising roughly 88 percent of the sites. The type includes what others have classified as "open lithic scatters" or "open campsites." Most of these sites include only lithic artifacts; less than 1 percent yield pottery. Sites in this category lack evidence of architecture, but may have small features, such as hearths, cists, or cairns. The function of open artifact scatters is highly variable, but probably includes short-term and possibly seasonal habitation and/or resource procurement and processing.

Sheltered Artifact Scatters

Sheltered artifact scatters include rockshelters and caves that contain lithic and/or ceramic artifacts. They constitute approximately 5 percent of the recorded sites. Sheltered artifact scatters may be more likely than other site types to be discovered and recorded, so may actually be over-represented in the sample. Sites in this type lack evidence of architecture, but may contain small features, such as hearths, cists, or cairns. Because of the high quality of shelter afforded by the caves or overhangs, many sheltered artifact scatters probably served for habitation.

Open Architectural Sites

Open architectural sites are relatively uncommon in the project area, comprising only 2 percent of the sites. Wickiups, circular stone structures, and stone alignments are the most common types of architecture found at open sites, though rubble mounds and room blocks also occur (Table 3). Pit structures may occur, though their definition is more tenable after excavation. Game blinds are also fairly common. Some of the sites defined as circular stone structures may have actually served as game blinds, though some are, undoubtedly, habitations.

Sheltered Architectural Sites

Rockshelters containing architecture are uncommon in the project area, comprising less than 1 percent of the sites. Sheltered architecture documented in the study area includes small masonry walls and stone alignments.

Rock Art

Rock art sites include pictographs and petroglyphs. Petroglyphs are more common than pictographs, possibly because they are more durable in exposed settings. Approximately 3 percent of the sites in the study area have rock art.

Table 3. Frequency of Architectural Types.

Architectural Type	Frequency	Percentage of Architectural Sites
Wickiups	33	31
Circular Stone Structures	23	22
Stone Alignments	20	19
Game Blinds	7	7
Rubble Mounds/Rooms/Room Block	12	11
Pit Structure Depressions	2	2
Sweatlodge	1	1
Unspecified Architecture	7	7
TOTAL	105	100

Lithic Procurement Sites

Sites classified as lithic procurement sites include formal quarries, where raw lithic material was mined through excavation, and areas where naturally occurring raw lithic material was collected from the ground surface and reduced.

Cambium Trees

Cambium trees evidence cultural peeling of in inner bark of a tree for use as food or other purposes (see Martorano 1988). On the Uncompahgre Plateau, ponderosa pine was the primary species exploited for its cambium. The peeled trees retain exposed rectangular or oval scars that generally extend from a few centimeters above the ground surface upward 2 or 3 m.

Isolated Features

A small number of sites in the study area consist of isolated small features, without apparent artifacts. Such features usually consist of hearths, cists, or cairns.

Human Burials

Four prehistoric human burials appear in the site database. Although they may occur in isolation, they are also found in possible association with apparent habitation sites. They occur in both sheltered and open settings.

Trails

A single American Indian trail has been entered in the site database. As discussed above, several other aboriginal trails are marked on historic GLO or more recent USGS topographic quadrangles. The trails identified on the maps have not been formally recorded; they will, nonetheless, be integrated into the GIS database.

Potential Sites

Betty and Harold Huscher's field notes contain information on a number of structural sites on the Uncompahgre Plateau. Bureau of Land Management archaeologists have been able to determine the exact or approximate locations for some of these sites. The site types include circular stone habitation structures, wickiups, and tree platforms – site types that are not abundantly represented in the sample of formally recorded sites. Data regarding the distribution of potential sites will be used during subsequent analyses as appropriated, reflecting the limitations of those data. Eighteen sites are herein regarded as potential sites (Table 4).

Table 4. Potential Sites Recorded by Huscher and Huscher (1939) with Estimated Locations.

Site Reference Number	Site Type
Huscher 69	Circular Stone Structure
Huscher 72	Circular Stone Structure
Huscher 74	Circular Stone Structure
Huscher 77	Circular Stone Structure
Huscher 78	Stone Enclosure
Huscher 79	Circular Stone Structure
Huscher 83	Circular Stone Structure
Huscher 93	Wickiup
Huscher 94	Wickiup
Huscher 97	Wickiup
Huscher 99	Wickiup
Huscher 102	Wickiup
Huscher 105	Wickiup
Huscher 110	Wickiup
Huscher 118	Tree Platform
Huscher 119	Tree Platform
Huscher 125	Tree Platform
Huscher 127	Tree Platform

Affiliation with Archaeological Units

Whenever possible, the sites documented in the project area were assigned to the Paleoindian, Archaic, Formative, or Protohistoric eras, as defined by Reed and Metcalf (1999). Unit

assignments were made on the basis of chronometric data whenever possible, but diagnostic artifacts, such as ceramics and projectile points, were also employed. Some of the more common or important projectile point types that might be found in the study area are illustrated in Figure 3. The larger majority of sites, however, remain of unknown affiliation. Several sites are attributed to the Late Prehistoric archaeological unit, a unit not employed by Reed and Metcalf (1999). These sites evidently yielded arrow points or ceramic types that could not be confidently attributed to either the Formative or the Protohistoric units; retention of the Late Prehistoric unit conveys that the site dates sometime after about 400 B.C., however. Some sites appear to be multicomponent. In these cases, all components were tabulated independently. The independent treatment of the multicomponent sites results in a greater number of components than there are sites. Altogether, 3,581 components in the study area are classified.

As shown in Table 5, Paleoindian components are poorly represented in the site sample, comprising only 1 percent of the total. Archaic components are much more common, and even seem be more abundant than the later archaeological units (Figure 4). It must be noted, however, that the various archaeological units are of different duration. When the percentage that each archaeological unit comprises of the total span of human occupation is calculated, it is apparent that the frequency of Archaic sites is only slightly higher than might be expected if sites were evenly distributed throughout time (Table 6). Nearly twice the quantity of Formative era sites occur in the study area than expected, and six times as many Protohistoric-era sites occur in the study area than might be expected. Attribution of sites in the Late Prehistoric period to either the Formative or the Protohistoric units would amplify the over-representation of the most recent units even more so. Factors of site preservation and visibility undoubtedly are factors contributing to the over-representation of more recent sites. As will be discussed later, however, demographic trends may also have been a factor.

Table 5. Assignment of Archaeological Units and Associated Frequencies.

Archaeological Unit	Frequency	Percentage of Components
Paleoindian era	29	1
Archaic era	348	11
Formative era	121	4
Protohistoric era	163	5
Late Prehistoric period	159	5
Unknown	2,336	74
TOTAL	**3,156**	**100**

Table 6. Percentage of Sites by Archaeological Unit per Percentage of Span of Human Occupation.

Archaeological Unit	Duration of Unit, Years†	Percentage of Total Years of Occupation	Percentage of Components‡
Paleoindian era	5,100	38	3
Archaic era	6,000	45	51
Formative era	1,700	13	22
Protohistoric era	600	4	24
TOTAL	**13,400**	**100**	**100**

† After Reed and Metcalf 1999 ‡ "Unknown" and "Late Prehistoric" units omitted

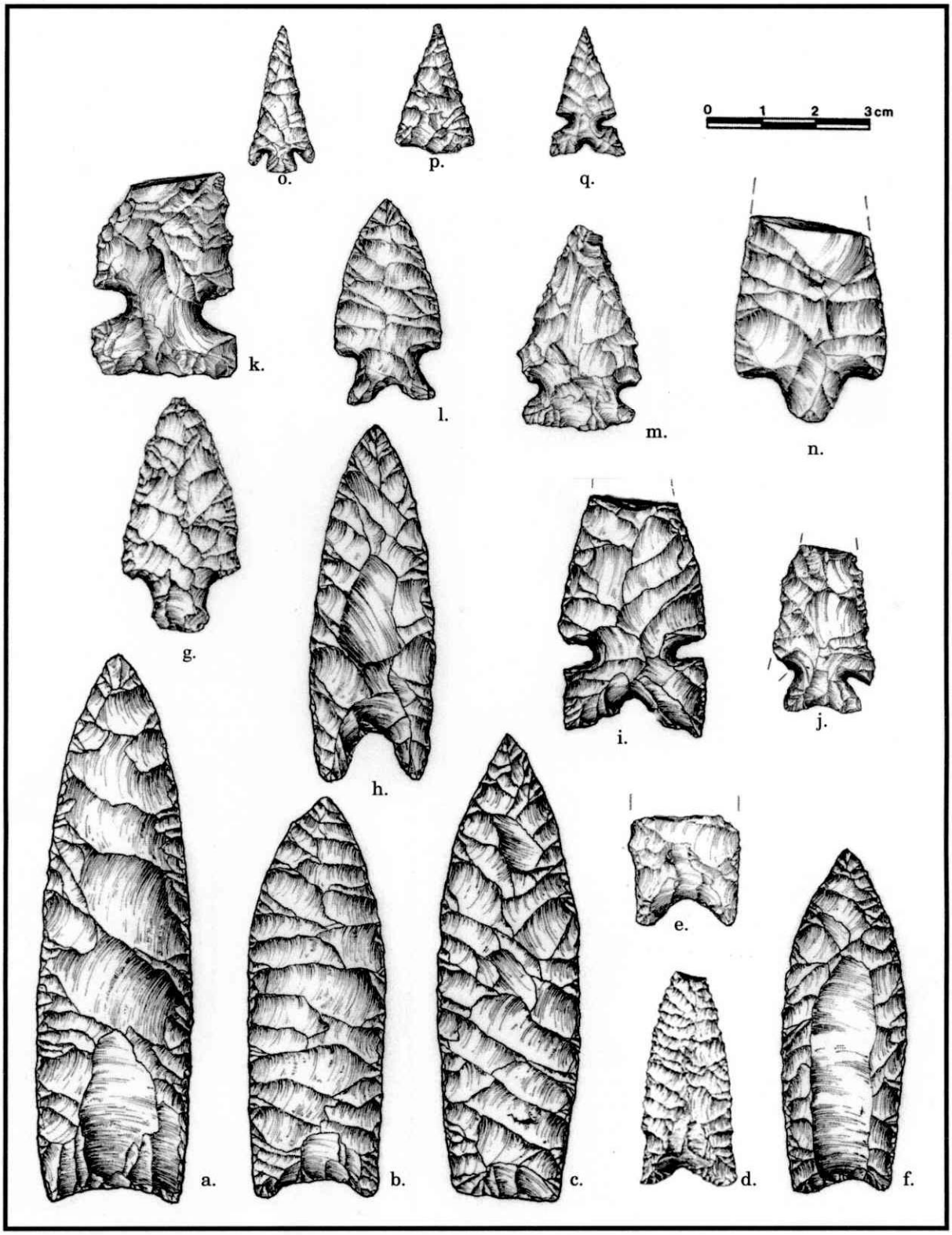
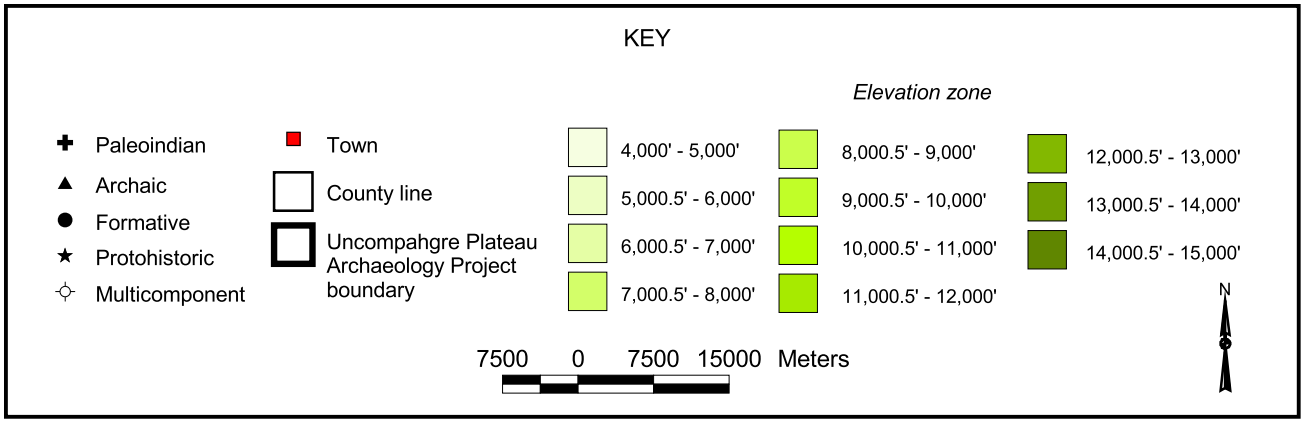


Figure 3. Examples of projectile point types that may occur in the study area. **a-f) Paleoindian points** (a, Clovis; b,Goshen; c, Angostura; d; Frederick; e, Jimmy Allen; f,Folsom); **g-n) Archaic points** (g, San Rafael Stemmed; h, McKean; i, Mallory; j, Elko Corner- notched; k, Northern Side-notched; l, Pinto; m, Elko Side-notched; n, Gatecliff Contracting Stem); **o) Formative point** (Rosegate); **p-q) Protohistoric points** (p, Cottonwood; q, Desert Side-notched).

Figure 4. Distribution of sites by archaeological unit.



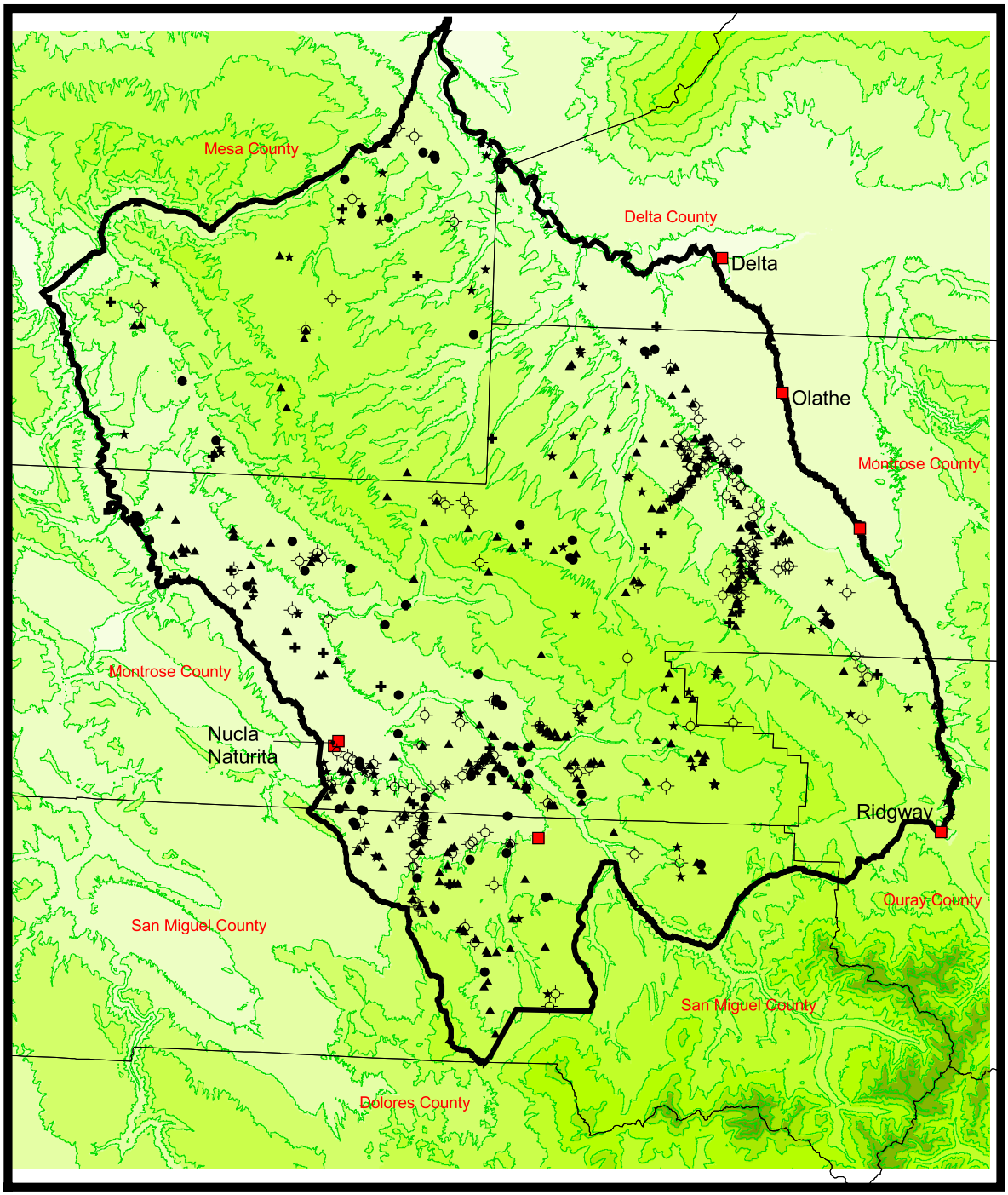


Figure 4. Distribution of sites by archaeological unit.

Chapter 3
Further Analysis of Existing Archaeological Collections

Introduction

One of the objectives of the Uncompahgre Plateau Archaeological Project (UPAP) is to evaluate extant archaeological collections from the study area in terms of their potential for providing information especially important for archaeological interpretations. If especially important samples or artifacts are present, then a small number of samples are to be selected for processing. This effort will facilitate the development of a research design and context specific to the study area.

The existing collections can, of course, be subjected to a wide range of analyses. The older archaeological projects seldom analyzed debitage, so basic lithic reduction strategies are usually not reported. The oldest projects also seldom fully analyzed faunal remains, and generally did not extract feature fills for macrobotanical or palynological analyses. Relatively new analytic techniques, such as radiocarbon dating, thermoluminescence dating, sherd petrography, protein residue analysis, and obsidian trace-element analysis were, of course, unavailable to early researchers. Many of these analytic methods can be applied to the older collections, if suitable materials exist.

The scope of the present project permits only selection of a small number of ancillary study specimens from the existing collections. It is necessary, therefore, to identify only the most important types of analyses. The determination of just what constitutes important analyses must be based on some sort of research design; for this effort, Reed and Metcalf's (1999) research design and context for the Northern Colorado River Basin will be employed. If a single line of research can be determined to be of paramount importance in the regional context, chronometric dating would stand out. Accurate determination of a site's age can greatly enhance the interpretation of other research domains discussed by Reed and Metcalf (1999), such as space/time systematics, subsistence and settlement patterns, technology, and origins and transitions.

The various collections from the study area's archaeological excavations are discussed below, particularly with reference to their potential for chronometric dating. The collections are roughly ordered from oldest to youngest.

Methods

The reports for the previous archaeological excavations conducted in the study area were inspected for evidence of the disposition of the associated collections. These excavation projects were described in the Previous Work section of this report. The reports were also examined to assess the adequacy of various lines of data presentation. As discussed above, it was apparent that the excavation projects conducted before 1980 were often incomplete by today's standards, whereas the more recent projects were relatively complete. Artifact catalogs were requested from the repositories of the older collections. In the case of the larger collections, only data regarding charcoal samples and perishable materials possibly suitable for radiocarbon dating were sought. Valuable assistance was provided by Ryntha Johnson of the Denver Museum of Nature and Science, Mark Stiger of Western State College, Marie Templeton of the Rimrock Historical Society, and Susan Thomas of the Anasazi Heritage Center.

Excavation Collections from the Study Area

Huscher's Collections

Betty and Harold Huscher of the Colorado Museum of Natural History conducted archaeological excavations in western Colorado in the late 1930s and early 1940s. As described

above, eight of the sites are within the study area. The excavated materials are curated at the Denver Museum of Nature and Science. Unfortunately, efforts to correlate collection constituents to specific sites have been largely unsuccessful. Animal bones, corncobs, a bead, and an arrow shaft fragment have been determined to be associated with site HBL, an excavated site in the Gunnison River drainage, but the exact location of the site is unknown.

Curated materials in the Huschers' Collections include projectile points, various chipped or ground stone tools, debitage, animal bone fragments, bone tools, pottery sherds, wooden arrow shafts, stone beads, corncobs, and charcoal. The Huschers' report contains no radiocarbon or tree-ring dates. Sites are cross-dated with Anasazi ceramics. Presentation of archaeofaunal data is limited to a listing of all species found by the project. Macrobotanical analysis is limited to recovered corn. Debitage is not discussed, though formal tools and pottery are described by class, with few references to specific sites.

In 1992, Herbert Solomon, then of the University of Southern Colorado, completed a Master's thesis titled *A Reevaluation of the Huscher Collection*. Solomon (1992) observed that some of the problems with the collection resulted from incomplete field records. Whereas the Huschers' field notes for the 1939 field season are on file at the Denver Museum of Nature and Science, the 1940 and 1941 field notes are missing. Solomon was also unable to find a complete list of the temporary site numbers that the Huschers used, and discovered that the method of artifact numbering employed resulted in multiple artifacts from multiple sites sharing the same number. Solomon's (1992) observations confirm that the collection's research value has been limited by shoddy site numbering, site mapping, and artifact labeling. Through work with the Huschers' Collection, Solomon (1992) was able to attribute a portion of the collection's artifacts to specific structural sites. The sites probably within the UPAP study area and their associated artifacts that are still in the collection are listed in *Table 7*.

Table 7. Quantity of Artifacts by Class Remaining in the Huschers' Collection. C.T. Hurst's Collections

Artifact Class	Site/Site Series			
	HJL (5MN3462)	HMF Sites	HSP	HH
Points	3	31	22	4
Knife/Points	2	4	4	0
Preform	0	1	1	0
Flakes	6	73	4	25
Cores/Hammers	2	3	0	0
Manos	1	0	1	0
Ceramic Sherds	0	75	106	0
Animal Bone	0	32	14	2

C.T. Hurst of Western State College conducted excavations at several important Formative-era sites in western Montrose County in the late 1930s and early 1940s. These sites include Tabeguache Caves I and II, Cottonwood Cave, Cottonwood Pueblo, and Tabaguache Pueblo. The rockshelter sites contained dry deposits where perishable materials were found. A large volume of artifacts and ecofacts was recovered and several short preliminary reports of the excavations were published (Hurst 1940, 1941, 1943, 1944, 1946, and 1948a). The reports illustrate and briefly describe some of the more significant artifacts recovered. As is common for reports of that period, debitage is largely ignored, and tools and ceramics are discussed by site, rather than by level or component. Faunal analysis consists of mention of the species represented, and macrobotanical analysis consists of descriptions of corn and squash and a list of wild species thought to represent food. Sediments were not floated to recover macrobotanical items. No radiocarbon sampling was conducted, as excavations predated the development and acceptance of that technique. Recently, however, Stiger (2001) has recently published four radiocarbon dates from Cottonwood, Tabeguache,

Tabeguache II, and Dolores caves, derived from samples collected by Hurst. Four tree-ring dates from Tabeguache Cave I were processed by Hurst's students. All dated to the first few centuries A.D.

The artifacts and related project materials are curated at Western State College. The catalogs for the sites indicate excavation unit and level, unlike catalogs for other archaeological collections made in the region at that time. Curated materials include many classes of stone, ceramic, and perishable items, as well as animal bone, "firewood," charcoal, and corn plant parts.

Wormington's Moore and Casebier Site Collections

The Moore and Casebier sites (5MN863 and 5MN864, respectively) were excavated by H. Marie Wormington in the late 1930s. Neither site was chronometrically dated. The artifacts are curated at the Denver Museum of Nature and Science. Alpine obtained a catalog of materials from the museum; it suggests that many artifacts from the Moore and Casebier sites are stored together with artifacts from the Taylor site, an important site just outside of the study area (see Wormington and Lister 1956). Artifacts listed on the catalog include "unsorted lithics," projectile points and other formal chipped-stone tools, manos, worked bone, and "quarry blanks." Wormington and Lister's (1956) report of the Moore and Casebier sites does not include any discussion of debitage. Discussions of formal tools often lump artifacts from both sites, making it impossible to determine the site affiliation of most artifacts. No charcoal samples suitable for radiocarbon dating are cataloged. Some of the bone artifacts or ecofacts may be suitable for radiocarbon dating. Dating of bones is not currently advisable, however, because the faunal sample is not described in Wormington and Lister's (1956) report to current standards. The species from both sites are discussed together and are simply listed in order of frequency of occurrence. Further analysis of the bone artifacts or ecofacts is necessary before any are destroyed for radiocarbon dating.

Hauser Site Collection

The Hauser site (5MN2) was excavated twice. The rockshelter was first excavated in 1960 by the Chipeta Chapter of the Colorado Archaeological Society. Proveniences were recorded for some, but not all, of the artifacts (Lister and Sanburg 1963). Artifacts recovered included a short length of sinew, an arrow foreshaft, a gypsum ornament, bone awls, bifaces, scrapers, projectile points, drills, manos, mauls, and hammerstones (Lister and Sanburg 1963). No mention is made of debitage. No chronometric samples were collected. Eighty-five artifacts were described by Lister and Sanburg (1963). The artifacts from this phase of site investigation were kept by their finders, so no collection suitable for further analysis exists.

William Buckles (1971) conducted additional excavations at the Hauser site as part of the Ute Prehistory Project. Buckles' excavations focused on discerning the stratigraphy of the site, but these efforts were unsuccessful, as only disturbed deposits were encountered. Buckles recovered a small quantity of chipped and ground stone tools and a single sherd. No debitage was reported. These cultural materials are currently at the Anasazi Heritage Center (AHC) in Dolores, Colorado. No samples suitable for radiocarbon dating are present. The sherd recovered by Buckles is apparently associated with a Protohistoric-era occupation of the site. It is unknown whether it exceeds 6 mm in thickness and is, therefore, suitable for thermoluminescence dating. Even if the sherd is sufficiently thick for thermoluminescence dating, however, it is probably unsuited for such analysis, considering its recovery in disturbed deposits and the lack of recorded artifacts or features in clear association with the ceramic artifact.

Buckles's Ute Prehistory Project Collections

William G. Buckles conducted substantial excavations at 35 prehistoric sites and smaller-scale investigations at several other sites within the study area as part of the Ute Prehistory Project. These investigations occurred in the early 1960s and resulted in the recovery of thousands of

artifacts. Buckles's (1971) resulting dissertation focused extensively on recovered formal stone tools and ceramic artifacts. Many tool types were defined. Site descriptions contain tables that show the distributions of artifact types by provenience. Because of the large quantity of artifacts in the collection, Buckles mostly ignored debitage. In fact, debitage was not collected in the field during the 1961 and early 1962 field seasons (Buckles 1971). Simple debitage counts were presented for only four sites: the Shavano Spring site (5MN40), the Frank Bond site (5MN57), the Roubideau Rim site (5MN55), and Christmas Rockshelter (5DT2). Faunal data are also scarce. Buckles (1971) reports that the faunal collection was submitted to the University of Colorado Museum for study, but that the collection was lost before it could be studied. As is shown below, some unmodified animal bones remain in the collection, but these, too, are unanalyzed. Macrobotanical samples were not routinely collected and no palynological analysis was conducted. Only two radiocarbon determinations were obtained for Buckles' dissertation; both were from the Shavano Springs site (5MN40). In 1985, Buckles submitted an additional seven radiocarbon samples from Ute Prehistory Project sites with the assistance of Archaeological Consultants in Durango, Colorado (Buckles 1985). Six of these radiocarbon samples were from the Christmas Rockshelter (5DT2), and one was from the Sanburg site (5MN43) (**Table 8**).

The Ute Prehistory Project collections are at the Anasazi Heritage Center in Dolores, Colorado. AHC personnel have recently computerized the project catalog. The catalog indicates that 54 radiocarbon samples from 19 sites in the collection may be suitable for processing (Table 9). Additionally, the catalog indicates that 31 sites yielded animal bone, corn, wood, or artifacts fashioned from perishable materials that could possibly be used for radiocarbon dating (**Table 10**).

Table 8. Ute Prehistory Project Radiocarbon Dates.

Site No.	Processed Sample No.	Conventional Radiocarbon Age B.P.	Dated Material	13C/12C Ratio	Provenience	Calibrated Range (Two Sigma)
5DT2	Beta-12980	1280 ± 70	Charcoal	-25 o/oo	Level 6	A.D. 645-944
	Beta-13055	6660 ± 100	"Organics"	-25 o/oo	Level 8	5692-5526 B.C
	Beta-13056	6650 ± 200	Charcoal	-25 o/oo	Level 9B	5941-5222 B.C.
	Beta-13888	7140 ± 110	Charcoal	-25 o/oo	Level 8	6178-5731 B.C.
	Beta-13995	1300 ± 70	Charcoal	-25 o/oo	Level 5	A.D. 633-889
	Beta-14424	6600 ± 110	Charcoal	-25 o/oo	Level 8	5668-5288 B.C.
5MN40	Isotopes-820	2100 ± 150	Charcoal	?	E.U. 1, Level 4	575 B.C.-A.D. 230
	Isotopes-821	2695 ± 180	Charcoal	?	E.U. 1, Level 5	1340-415 B.C.
5MN43	Beta-13054	2280 ± 80	Charcoal	-25 o/oo	Level 5	512-124 B.C.

Table 9. Radiocarbon and Tree-Ring Samples Available for Study: Ute Prehistory Project Collection.

Site/Catalog No. 99.33.	Sample Type	Horizontal Location	Level	Comments
5DT2.2295	Radiocarbon	40S/5E	7	Level 7 is between Cultural Levels 2 and 3
5DT2.2296	Radiocarbon	40S/5E	7	Level 7 is between Cultural Levels 2 and 3
5DT2.2354	Radiocarbon	30S/0W	4	Level 4 is also Cultural Level 1
5DT2.2355	Radiocarbon	45S/5E	6	Level 6 is also Cultural Level 2
5DT2.2356	Radiocarbon	0N/0W	24-30 inches	
5DT2.2359	Radiocarbon	30S/10E	11a	Near base of excavations
5DT2.2361	Radiocarbon	65S/5E	8.0-8.4 ft.bd*	
5DT2.2362	Radiocarbon	45S/0W	5.2-5.55 ft.bd*	
5DT2.2363	Radiocarbon	35S/0W	5.6-5.95 ft.bd*	
5MN4.42	Radiocarbon	Test A	6-12 in.	Depth below surface?
5MN9.31	Radiocarbon	Test A	18-24 in. bs**	
5MN9.32	Radiocarbon	Test A	Feature 2	

Table 9. Radiocarbon and Tree-Ring Samples Available for Study: Ute Prehistory Project Collection.

Site/Catalog No. 99.33.	Sample Type	Horizontal Location	Level	Comments
5MN10.17	Radiocarbon	Test A	0-6 in. bs**	
5MN10.22	Radiocarbon	Feature 2	6-12 in. bs**	
5MN14.191	Radiocarbon	--	21 in. bs**	
5MN14.192	Radiocarbon	Feature 1	Feature 1	
5MN14.193	Radiocarbon	--	17 in. bs**	
5MN14.194	Radiocarbon	--	8 in. bs**	
5MN14.195	Radiocarbon	Feature 1	Below Feature 1	
5MN14.196	Radiocarbon	--	7 in. bs**	
5MN14.197	Radiocarbon	Feature 1	Below Feature 1	
5MN15.105	Radiocarbon	5N/0W	Level 2	Level 2 is also Cultural Level 1
5MN15.106	Radiocarbon	10N/0W	Level 2	Level 2 is also Cultural Level 1
5MN15.107	Radiocarbon	10N/0W	Level 3	Level 3 is also Cultural Level 2
5MN15.108	Radiocarbon	10N/0W	Level 3	Level 3 is also Cultural Level 2
5MN15.109	Radiocarbon	5N/0W	Level 3	Level 3 is also Cultural Level 2
5MN17.72	Radiocarbon	20W/5N	Level 4	
5MN18.18	Radiocarbon	Test A	0-6 in.	
5MN20.3	Radiocarbon	Test A	0-6 in. bs**	
5MN25.3	Radiocarbon	Test A	0-6 in. bs**	
5MN26.6	Radiocarbon	Test A	32-38 in. bs**	
5MN26.7	Radiocarbon	Test A	38.4 in. bs**	
5MN28.100	Radiocarbon	22W/0N	Feature 1	
5MN30.48	Radiocarbon	5N/0W	Level 2	Feature 1
5MN34.157	Radiocarbon	20N/0E	Feature 1	
5MN34.158	Radiocarbon	Feature 1	6-12 in. bs**	
5MN34.159	Radiocarbon	Feature 2	12-18 in. bs**	
5MN34.160	Radiocarbon	10N/5W	Level 1	Feature 3
5MN34.161	Radiocarbon	25N/0E	6-12 in. bs**	
5MN37.17	Radiocarbon	10N/5W	Feature 1	
5MN40.694	Radiocarbon	10N/0W	Level 5	Feature 4
5MN40.695	Radiocarbon	10N/0E	Feature 1	
5MN40.696	Radiocarbon	10N/5E	16 in. bs**	
5MN40.697	Radiocarbon	20N/0E	Feature 1	
5MN40.698	Radiocarbon	10N/0W	Feature 4	
5MN40.923	Radiocarbon	5N/5E	Feature 2	1 ft. south of cited unit
5MN40.1058	Radiocarbon	Feature 5	Feature 5	
5MN41.32	Tree Ring	Wickiup 8		
5MN41.35	Tree Ring	Wickiup 1		
5MN42.10	Tree Ring	Wickiup 2-1		
5MN42.11	Tree Ring	Wickiup 1-1		
5MN43.868	Radiocarbon	0N/30E	Level 7	
5MN43.869	Radiocarbon	0N/30E	Level 7	
5MN43.870	Radiocarbon	10S/30E	Level 1	

* "bd" refers to "below datum plane." ** "bs" refers to "below modern ground surface."

Table 10. Artifacts and Ecofacts Possibly Suitable for Radiocarbon Dating: Ute Prehistory Project.

Site No.	Material					
	Unmodified Bone	Modified Bone	Corn	Cane	Unmodified Wood/Bark	Perishable Artifacts
5DT2	X	X	X		X	X
5ME1	X	X			X	
5MN2	X					
5MN4	X					
5MN5	X					
5MN6	X			X	X	X
5MN9	X	X			X	
5MN10	X					
5MN14	X					
5MN15	X					
5MN18					X	
5MN21	X					
5MN25					X	
5MN26	X					
5MN27	X					
5MN28	X					
5MN30	X					X
5MN34	X					
5MN37	X	X				
5MN38	X					
5MN40	X	X				
5MN41	X				X	
5MN42	X					
5MN43	X	X			X	
5MN44	X					
5MN48					X	
5MN54	X					
5MN57	X				X	
5MN58	X					
5MN61	X	X				
5MN63	X					

Weimer Ranch Collections

Between 1974 and 1976, Metropolitan State College conducted an archaeological field school at several sites with prehistoric architecture in western Montrose County. Portions of sites 5MN368, 5MN652, 5MN653, and 5MN654 (Cottonwood Pueblo) were excavated, yielding a substantial quantity of lithic and ceramic artifacts. Charred corncobs were also found, and four radiocarbon dates were obtained for sites in the study area (*Table 11*) (Crane 1977). Only minimal work was conducted at site 5MN368. The project was fraught with problems, and a formal excavation report was never written. Fortunately, Cathy Crane wrote her Master's thesis at Eastern New Mexico University on the project sites, and it contains much valuable information (Crane 1977). Crane's work indicates that ceramic artifacts were examined, and that macrobotanical samples were processed. None of the stone artifacts appear to have been analyzed.

The Weimer Ranch artifacts are currently in the custody of the Rimrock Historical Society. Field notes are in the possession of the President of the Rimrock Historical Society, Ms Marie Templeton of Nucla, Colorado. According to Ms Templeton, an artifact catalog was never prepared.

The artifacts are stored in a building in Uravan, Colorado, where they are presently inaccessible because of hazards. The building in which the artifacts are stored is associated with the uranium industry (UMETCO) and is radioactive. Radioactive levels are sufficiently high that protective measures are necessary for access. Additionally, the storage building has long been the home of mice, as evidenced by copious amounts of mouse droppings. The building poses, therefore, a significant risk for hantavirus. According to the building's supervisor, access is contingent on use of a respirator, and a physical examination is necessary to authorize respirator use. Ms Templeton reports that the project artifacts stored in the building would fill two to three pick-up trucks.

A project objective had been to physically examine the Weimer Ranch collection, because an artifact catalog was lacking. This objective was not realized, however, because of the biological and radiological hazards associated with the artifact inspection. The artifacts hold high research value, and ancillary study samples may be present. Removal of the artifacts to a safer environment is necessary before the artifact inventory is conducted.

Contamination of the collection's artifacts and ecofacts from uranium decay does not reduce the value of project materials for radiocarbon dating. According to Darden Hood of Beta Analytic, Inc. (2003 personal communication to A.D. Reed), the only byproduct of uranium decay that might affect radiocarbon analyses is radon gas. Beta Analytic has the means to remove radon gas from archaeological samples and can redouble such efforts if they are aware of the collection's exposure to radon gas.

Table 11. Radiocarbon Determinations from the Weimer Ranch Project. Dallas Creek Project Collections

Site No.	Processed Sample No.	Dated Material	Radiocarbon Age	Provenience	Calibrated Range (Two Sigma)
5MN517	UGA-1132	Charcoal	A.D. 760 ± 355*	Hill 1 Structure	Not a credible date (Crane 1977)
5MN653	UGA-1375	Unknown	A.D. 580 ± 65*	Wagon Bend Structure	A.D. 515 to 645 (not supported by ceramics, which are later)
5MN368	UGA-1274	Bone?	A.D. 1080 ± 70*	Human Skeleton	A.D. 1010 to 1150
5MN654	UGA-1379	Unknown	A.D. 1045 ± 65*	House 3	A.D. 1020 to 1250

The Dallas Creek Project was conducted by ESCA-Tech Corporation in advance of construction of Ridgway Reservoir. Starting in 1979, five prehistoric sites in the UPAP study area were excavated. Recovered artifacts and associated literature were submitted to the Bureau of Reclamation upon completion of the project. The Bureau of Reclamation then submitted the materials to the Ouray County Historical Society Museum in Ouray, Colorado, for curation.

The Dallas Creek Project employed contemporary field and analytic methods. Artifacts are adequately described, and ancillary study samples were processed to establish site chronology and subsistence practices (Muceus and Lawrence 1986). There is little reason to suspect that additional analysis of the project's collection would contribute substantial scientific data, based on current research objectives.

Harris Site Collection

The Chipeta Chapter of the Colorado Archaeological Society conducted excavations at the Harris site (5MN2341) in the mid-1980s. The work was directed by Gordon C. Tucker, then of Nickens and Associates (Tucker and the Colorado Archaeological Society 1989). Specialists in geomorphology, macrobotanical analyses, palynology, and archaeofaunal analyses, were employed. Field and analytic methods were much the same as those used by archaeologists today. It is unlikely

that substantial contributions would result from additional analyses of the Harris Site collection. Materials from the project are curated at the Anasazi Heritage Center in Dolores, Colorado.

Site 5MN3760 Collection

Grand River Institute conducted surface artifact collection and limited excavation at site 5MN3760 south of Naturita Creek. The work was conducted for Lillyland Inc. and Colorado Mined Land Reclamation, as part of a mitigation program resultant from developments at the Hamilton Mine (Conner and Hutchins 1992). Investigations revealed two hearths and a collection of lithic artifacts. Two radiocarbon determinations were obtained; both indicated Late Archaic occupations. Other components may also be present, based on diagnostic surface artifacts. The collections were returned to the landowner, so are unavailable for further study.

Fallen Deer Site Collection

Metcalf Archaeological Consultants, Inc. conducted excavations at the Fallen Deer site (5SM2578) in 1997 in advance of a land exchange (McDonald 1998). No radiocarbon determinations were obtained, though the site was dated by cross-dating Anasazi ceramics. Artifacts and ancillary study specimens were analyzed to current standards. No additional study of the collection appears necessary, based on current research objectives. The collection is at the University of Colorado's Henderson Museum in Boulder.

TransColorado Pipeline Project Collections

Excavations for the TransColorado natural gas pipeline project were conducted in 1997 and 1998 by Alpine Archaeological Consultants and Centennial Archaeology. Substantial excavations were conducted at 10 sites in the UPAP study area. A wide range of ancillary studies were conducted as part of the project, and artifacts and ecofacts were adequately described (Reed 2001). Additional analysis of materials appears unnecessary in the context of current research issues. Artifacts from the project were either submitted to the Anasazi Heritage Center (AHC) or were returned to the private landowner, if the landowner so requested. Of the 10 extensively excavated sites in the study area, the AHC has collections from 5MN2628, 5MN3859, 5MN3861, 5MN3876, 5MN4082, 5MN4253, 5SM2423, and 5SM2478. Private landowners retained the collections from 5MN4270 and 5SM2425.

Selection of Samples for Processing

Radiocarbon Dating

In consultation with the agency archaeologists overseeing the project, and with consideration to the research design presented above, five radiocarbon samples from existing archaeological collections were selected for processing by Beta Analytic, Inc. (Table 12). As previously discussed, chronometric data are especially important for interpretation of the archaeological record, thereby elevating radiocarbon dating above macrobotanical, archaeofaunal, and other types of possible analyses. The five radiocarbon samples were selected with two objectives in mind. The first objective was to demonstrate the presence of Paleoindian components at sites yielding Paleoindian projectile points. Paleoindian components represent approximately 1 percent of the study area's sites identified during archaeological inventories, and only one excavated site has yielded undoubted evidence of a Paleoindian component. Because so little is known about the Paleoindian occupation of the study area, the identification and investigation of definite Paleoindian components are important objectives. The sample from Level 11a at Christmas Rockshelter and the samples from Juanita's Shelter, Initial site, and Sanburg site were processed in the attempt to identify Paleoindian cultural deposits.

As indicated in Table 13, none of the radiocarbon samples yielded determinations consistent with Paleoindian occupations. Although the samples represented the deepest cultural levels at the

subject sites, none of the dates precede about cal 2600 B.C. The date of Level 11a at Christmas Rockshelter of cal 2880 – 2580 B.C. is disconcerting because it is much more recent that dates obtained from Levels 8 and 9, which are stratigraphically superior (**Table 8**). The site appears to have been subjected to soil mixing. The Midland projectile point found at the site by Buckles (1971) does not appear to be from a discrete Paleoindian component; perhaps it was collected elsewhere by Archaic-era peoples and brought to the site. Buckles's (1971) Buttermilk assemblage remains undated, and is probably of little research interest because it can no longer be considered to possibly be Paleoindian. Buckles (1971) recovered three projectile points from Level 3 at Juanita's Shelter. One was a large corner-notched type and two were Paleoindian point bases. Charcoal from Level 3 yielded a date range of cal A.D. 80 – 390, however, clearly indicative of an early Formative-era occupation. Buckles (1971) suspected that the Paleoindian points were brought to the site by later occupants; the radiocarbon data now support his suspicion. Projectile points were recovered in Levels 1 through 4 at the Initial site (Buckles 1971). A Paleoindian point was found in Level 1, and later corner-notched and stemmed points were found in lower levels. The radiocarbon determination from Level 4 indicates that the Paleoindian point was not brought up to the site's surface by pedoturbation, as the deepest level is chronometrically dated to the late Archaic (830 to 590 cal B.C.). Buckles (1971) recovered a Paleoindian projectile point base in Level 1 at the Sanburg site, and inferred that it was introduced to the site by later inhabitants. His interpretation is now supported by radiocarbon data, which indicate that some of the site's deepest deposits date to cal A.D. 1010 to 1260, late in the Formative era.

Table 12. Samples Selected for Radiocarbon Dating.

SITE NUMBER	SITE NAME	CATALOG NO.	PROVENIENCE AND COMMENTS	RADIOCARBON SAMPLE NO.
5DT2	Christmas Rockshelter	99.33.5DT2.2319	Corn kernel, Level 3, 25S/0W	Beta-183532
5DT2	Christmas Rockshelter	99.33.5DT2.2359	Level 11a, 30S/10E	Beta-183533
5MN15	Juanita's Shelter	99.33.5MN15.109	Feature 1, Level 3, 5N/ 0W	Beta-183534
5MN17	Initial Site	99.33.5MN17.72	Level 4, 20W/5N	Beta-183535
5MN43	Sanburg Site	99.33.5MN43.869	Level 7, 0N/30E	Beta-183536

Table 13. Radiocarbon Results.

Sample No.	Site No.	Measured Radiocarbon Age B.P.	13c/12c Ratio	Conventional Radiocarbon Age B.P.	Calibrated Range (2 Sigma)	Material Dated
Beta-183532	5DT2	100.5 ± 0.5 mMC	-8.5 o/oo	230 ± 40	A.D. 1530 – 1950	Corn kernel
Beta-183533	5DT2	4100 ± 40	-23.0 o/oo	4130 ± 40	2880 – 2580 B.C.	Wood charcoal
Beta-183534	5MN15	1800 ± 60	-25.0 o/oo	1800 ± 60	A.D. 80 – 390	Wood charcoal
Beta-183535	5MN17	2600 ± 50	-25.0 o/oo	2600 ± 50	830 – 590 B.C.	Wood charcoal
Beta-183536	5MN43	910 ± 60	-25.0 o/oo	910 ± 60	A.D. 1010 – 1260	Wood charcoal

A secondary research objective was to chronometrically date the corn that Buckles (1971) recovered in Level 3 of the Christmas Rockshelter. Buckles did not obtain chronometric dates for Level 3, but attributed it to his Coal Creek phase on the basis of projectile point types – a phase post-dating A.D. 1000. As discussed in the Formative-era research design, discerning temporal patterns of corn use in the region is an important research goal. Only three well-reported excavated Protohistoric sites on the eastern side of the Uncompahgre Plateau have yielded cultigens, and the evidence at those sites is sparse and, in some cases, ambiguous. The corn kernel from Christmas Rockshelter was unburned and in excellent shape; its identification as a cultigen is undoubted.

The corn kernel was subjected to AMS dating. The radiocarbon determination had a calibrated range (two sigma) of cal A.D. 1530 to 1950. The corn was grown, therefore, either during

the Protohistoric era or during the Euroamerican historic period. Because no corn has been found in aboriginal Protohistoric-era contexts in west-central Colorado that dates before the late nineteenth century when government annuities were available to the Ute, it is seems likely that the corn was introduced to the site by Euroamericans. Buckles (1971) found historic artifacts on and near the site surface and also noted that the rockshelter might have been used as a corral during the historic period.

Recommended Analysis

During the analysis of the research potential of the existing museum collections, it became apparent that further treatment of the Weimer Ranch Collections would constitute a substantive contribution to the region's prehistory. The sites represent late Formative-era occupations of the study area by horticulturalists who constructed masonry habitation structures. Few such Gateway tradition sites have been excavated in the region and, of those, most were excavated by the Huschers or by C. T. Hurst in the late 1930s and early 1940s. The Huschers and Hurst conducted their excavations before radiocarbon, palynological, archaeofaunal, and macrobotanical analyses were routinely applied; moreover, they produced a report very short on excavation details (Huscher and Huscher 1943; Hurst, various). The Weimer Ranch project, though beset with many field and analytic problems, certainly collected some ancillary study samples and may have recorded detailed proveniences of recovered materials. Provenience information may exist on artifact and sample bags, if not in field notes. The collection, therefore, has much more potential than the Huschers' collections. Hurst's collections from the Tabeguache and Cottonwood Pueblos retain significant research value, but at least have been described to some degree.

Because of the Weimer Ranch Collections probably retain high research value, partly because they have never been adequately documented, additional analyses of the collections are highly recommended. The Weimer Ranch Collections can probably provide important information regarding Gateway tradition chronology, technology, and subsistence.

Chronology

Metropolitan State College obtained credible radiocarbon dates for sites 5MN654 (Rim site) and 5MN368 (Battleship site). Chronometric dates are needed for Cottonwood Pueblo (5MN517), 5MN652 (Middle Hill), and 5MN653 (Wagon Bend). Dates are especially needed for site 5MN652, because, unlike Cottonwood Pueblo and Wagon Bend, the site did not yield ceramic artifacts suitable for cross dating. It is unknown whether there are materials suitable for radiocarbon dating from the three subject sites in the curated collection.

Subsistence

During excavations, five macrobotanical samples were collected during the project and were later processed. The results are included in Crane's (1977) thesis. Although the macrobotanical sample is very small by current standards, it seems unlikely that other, unprocessed samples are available for study. According to Crane (1977), no fewer than 5,300 animal bones were recovered; none was identified. Because faunal collections from other excavated Gateway sites are described only at the most cursory level, the Weimer Ranch Collections may provide the most complete record of Gateway tradition use of fauna that is available. Analysis of the faunal collection is recommended.

Technology

Project excavations focused on excavation of architectural units. The structures are briefly described by Crane (1977), but descriptions are inadequate. Field notes should be inspected to determine whether structure maps or photographs are available. An illustrated report of site architecture should be produced, if possible.

A moderately large sample of lithic artifacts was recovered during excavations that has never been analyzed or adequately described. Although Crane does not present artifact quantities for all sites, the data available suggests a minimum of 150 pieces of ground stone, 281 projectile points, and 5,900 pieces of debitage. Other stone tool categories are also mentioned, but quantities cannot be estimated. The lithic artifact collection should be, at least, minimally analyzed and reported. Such efforts should include classifying artifacts by type and illustration of diagnostic or unusual artifacts.

A total of 191 sherds was recovered by the project. Unlike other artifact classes, ceramic artifacts have been analyzed to some level, as all are classified by type. Overall, the sherd classifications are useful, though current analysts would probably classify the Chapin Gray sherds as indeterminate gray wares, unless rims were evidenced. Cortez Black-on-white may also be over-represented. The collection also has some very unusual types, such as a micaceous corrugated sherd, a sherd with corrugations on the interior surface, and several Gallup Black-on-white sherds. Reanalysis of these unusual sherds might yield different interpretations. In addition to the ceramics collected on Weimer Ranch, Metropolitan State College students also excavated at the Roc Creek site (5MN367), a structural site with ceramics and evidence of corn just west of the UPAP study area. They recovered 105 sherds at the site. Ceramic classifications were problematical (Crane 1977), but sherds were tentatively classified as Fremont types. Emery Gray predominated, and a very unusual type called Emery Corrugated was identified.

Additional ceramic analysis is recommended. Re-analysis should focus on the sites within the UPAP study area. A sample of the Emery Gray sherds from the Roc Creek site should also be reanalyzed, however. Although the sherds are not confidently classified, their attribution to the Fremont culture has had an impact on interpretations of the regional archaeological record. If reanalysis of a sample of the Roc Creek ceramic sample establishes Fremont affiliation, then archaeological models of the nature of Gateway/Fremont tradition interactions would be affected.

In short, the approximately 13,000 artifacts and ancillary study specimens in the Weimer Ranch Collections retain research potential. Cataloging, analyzing, and reporting on the collection could greatly contribute to our understanding of Gateway tradition sites.

Chapter 4
Paleoindian-Era: Context and Research Design

Introduction

Human occupation of the UPAP study area probably commenced with the Paleoindian era. No evidence of a Pre-Clovis occupation has been found in western Colorado. The Paleoindian era subsumes what Wiley and Phillips (1958) have defined as the Lithic or Paleoindian stage, an adaptation by the early immigrants to the New World to terminal Pleistocene environments. The Lithic stage is purported to represent an big-game hunting adaptation, though gathering may have been an important subsistence activity in some areas.

Following Reed and Metcalf (1999), the Paleoindian era is defined for the period between approximately cal 11,450 and 6450 B.C. These dates are older than what appears in much of the region's archaeological literature because they have been calibrated and reflect adjustments proposed by Fiedel (1999). Fiedel (1999:99) has shown that several periods occurred during the late Pleistocene and early Holocene when "abnormally large ratios of ^{14}C effectively counterbalanced the radioactive decay rate, such that radiocarbon ages appear to remain constant over centuries of elapsed calendrical time."

The Paleoindian era is divided into early and late periods to account for obvious changes in projectile point types and, to a lesser extent, changes in settlement and subsistence practices. The early period of the Paleoindian era extends between approximately cal 11,450 and 9550 B.C. It includes the Clovis, Goshen, and Folsom traditions. Now extinct fauna were intensively exploited during the early period, especially during the Clovis tradition. The Clovis and Folsom traditions are characterized by large, finely crafted fluted projectile points. The late period of the Paleoindian period is herein dated between cal 9550 and 6450 B.C. A wider variety of lanceolate projectile points were manufactured during the late Paleoindian period, but none were fluted. As will be discussed below, the late Paleoindian period appears to represent increased variability, possibly because of the adoption of subsistence practices more intensively focused on localized resources.

Quality of the Database

Thirty-one Paleoindian sites and six isolated finds have been identified in the UPAP study area (**Table 14**). This total includes three cases where Paleoindian artifacts were found in the vicinity of a recorded site, but possibly not within the boundaries of a site. Less than 1 percent of the sites recorded in the study area have yielded Paleoindian artifacts. Considering that the Paleoindian era endured for approximately five millennia – roughly 38 percent of the period of human occupation of the region – the dearth of Paleoindian materials is striking. Although erosion and other site preservation factors have probably destroyed or reduced the visibility of the region's oldest sites, it also seems likely that human populations were very low on the Colorado Plateau during the Paleoindian era.

The quality of the Paleoindian database is small and relatively unreliable. Only one definite Paleoindian component has been identified in the study area. The Broken Leg site (5SM2423) was excavated during the TransColorado pipeline project; it yielded several diagnostic Foothill-Mountain tradition projectile point varieties, a spurred scraper, and two radiocarbon determinations attributable to the late Paleoindian occupation (Firor 2001). The calibrated radiocarbon dates. indicated site occupation sometime between cal 8550 and 8250 B.C. (Firor 2001). Most of the other sites herein attributed to the Paleoindian era are either unexcavated or include a small quantity of Paleoindian artifacts in apparent association with artifacts attributed to later eras. The Christmas Rockshelter is an example of the latter case, where a Midland projectile point was found in a level that was chronometrically coeval with an overlying Archaic level yielding Archaic artifacts (Buckles 1985). In the case of Tabeguache Cave (5MN868), the Initial site (5MN17), and Shirley's Shelter

Table 14. Paleoindian Artifacts in the UPAP Study Area.

Site No.	Site Name	Point Types	Comments	Reference
5DT2	Christmas Rockshelter	Midland, Scottsbluff, Plainview, Unident. Fluted	Fluted point tenuous	Buckles 1971
5ME5321		Scottsbluff	Isolated Find	Pitblado 1993
5ME5327		Midland	Isolated Find	Unknown
5ME5373		Cody Complex	Isolated Find	Pitblado 1993
5ME12310		Unknown	Isolated Find	Lazorchak 2000c
5MN15	Juanita's Shelter	Plainview		Buckles 1971
5MN17	Initial Site	Scottsbluff, Hell Gap	In site vicinity	Buckles 1971
5MN28	Shirley's Shelter	Meserve	In site vicinity	Buckles 1971
5MN35	Bedrock Pit	Meserve		Buckles 1971
5MN40	Shavano Spring	Unspecified Plano		Buckles 1971
5MN43	Sanburg Site	Plainview		Buckles 1971
5MN55	Roubideau Rim	Scottsbluff		Buckles 1971
5MN81		Deception Creek		Botsford 2001a
5MN281		Plainview		Pitblado 1993
5MN517	Cottonwood Pueblo	Yuma (Cody complex)	In later deposits	Hurst 1948a
5MN618		Unknown		Biggs and Richens 1979
5MN666		Hell Gap		Martin 1977
5MN701		Unspecified Plano		Martin 1977
5MN708		Plainview		Martin 1977
5MN803		Unknown		Pitblado 1993
5MN804		Unknown		Unknown
5MN868	Tabeguache Cave	Yuma (Cody complex)	In site vicinity	Hurst 1944
5MN1514		Unknown		McKeever and Murphy 1980
5MN1741		Angostura		Klesert and Webster 1981
5MN2341	Harris Site	Midland, Agate Basin		Tucker and CAS 1989
5MN2439		Jimmy Allen/Frederick	Recent discovery on previously recorded isolated find	McGuire 2003
5MN3543		Unknown		Painter et al. 1993
5MN3799		Unknown		Painter et al. 1993
5MN4439		Unspecified Plano		Currit 1994b
5MN4668		Unknown	Isolated Find	Baker 1996
5MN6000		Eden		Conner and Davenport 2002
5MN6640		Jimmy Allen/Frederick	Isolated Find	McGuire 2003
5OR872		Unknown		Rupp 1986
5SM345		Hell Gap		Gleichman and Legard 1977
5SM349		Jimmy Allen		Gleichman and Legard 1977
5SM630		Unknown		Webster and Baker 1981
5SM1953		Clovis	Tentative	Fike 1994a
5SM2423	Broken Leg Site	Frederick	Excavated component	Firor 2001

(5MN28), the Paleoindian artifacts were found in the general vicinities of the cited excavated sites, rather than within excavated sediments, so could be regarded as isolated finds, completely unrelated to the excavated components (see Hurst 1944; Buckles 1971). That diagnostic Paleoindian artifacts occur in deposits that are attributed to later archaeological units on the basis of a preponderance of evidence suggests collection and reuse of the materials by later peoples and, in some cases, mixing of

archaeological sediments. It is also possible that Archaic lifeways and material culture may have appeared in the region before the complete demise of the Paleoindian lifeway (Schroedl 1991; Reed and Metcalf 1999). Regardless of contextual problems, most researchers focusing on the region's Paleoindian era agree that sufficient quantities of Paleoindian artifacts are present to demonstrate their occupation of the region, rather than collection and curation of such artifacts by later peoples (e.g., Pitblado 2003).

The quality of the Paleoindian database – and the resulting interpretations – will improve with the inclusion of additional discrete Paleoindian components. These may include both chronometrically dated components yielding diagnostic Paleoindian artifacts and unexcavated components with multiple diagnostic Paleoindian artifacts that are horizontally segregated from later diagnostic artifacts.

Chronology

The chronology of Paleoindian occupation of western Colorado is a major topic of research. Relatively few Paleoindian components have been chronometrically dated in the region, and the small database hampers interpretations. Radiocarbon dating is further complicated by Fiedel's (1999) observation that periods within the late Pleistocene and early Holocene were characterized by abnormally large ratios of ^{14}C, resulting in an underestimation of elapsed calendrical time.

A single Paleoindian component has been chronometrically dated in the UPAP study area. The Broken Leg site (5SM2423), a large multicomponent site southwest of Norwood, Colorado, was subjected to extensive archaeological excavations during the TransColorado pipeline project (Firor 2001). Excavations at the site yielded four late Paleoindian projectile points, similar to Frederick/James Allen points, a type attributed by Pitblado (2003) to the period between cal 8720 and 4910 B.C.. A spurred scraper and a small sample of other lithic artifacts were also attributed to the site's Paleoindian component. Two hearths were subjected to radiocarbon dating; these indicated site occupation sometime between cal 8540 and 8240 B.C. (Firor 2001).

Excavated sites provide superior insight into chronology. Such sites often yield chronometric dates; furthermore, the effects of mixing of artifacts from multiple components can be better assessed. With only a single definite, excavated Paleoindian site in the study area, temporal trends in settlement are difficult to discern. Survey-level data will, therefore, be considered, to increase sample size. Twenty-eight locations in the study area have yielded one or more classifiable projectile points attributable to the Paleoindian era. These include points that are attributed to a specific complex, but not type (i.e., Cody complex), and discarded types, such as Yuma points, that are now attributed to the Cody complex (see Wormington 1957). To minimize the effects of excavated sites yielding relatively large quantities of points of the same type, Paleoindian point types from each site are counted as a single representation of the type. No effort is made to eliminate Paleoindian projectile points excavated within clearly later contexts. To do so would be to overemphasize Paleoindian points from unexcavated sites, which may or may not be present in their original context.

The typed Paleoindian projectile points in the study area are listed in **Table 15**. The table also lists the periods of manufacture for the types, as indicated by radiocarbon data. Most of the point type date ranges are derived from Pitblado's (2003) recent book. The date ranges for the point types dicussed by Pitblado have been calibrated, using Calib 4.4.2 and a constant standard deviation of ± 200 years. Each range beginning or end point was derived by taking the midpoint of the newly calibrated range. These data are graphed in Figure 5. The graph indicates steady occupation of the study area until approximately cal 7000 B.C., when few late Paleoindian point types occur. The apparent demise after cal 7000 B.C. should not necessarily be construed as a population decline, but might represent a shift to Archaic-era technology.

Table 15. Paleoindian Points and Possible Quantity of Components.

Projectile Point Types/Complexes	Radiocarbon Period cal B.C.	Quantity Of Possible Components
Clovis	13,400 – 12,500	1
Midland	12,800 – 11,500	3
Plainview and Meserve	11,260 – 6970	7
Hell Gap	10,360 – 8750	3
Agate Basin	10,360 – 8960	1
Angostura	9220 – 6510	1
Eden	8890 – 7120	1
Scottsbluff/Cody Complex	8750 – 8210	7
Frederick/Jimmy Allen	8720 – 4910	3
Deception Creek	7710 – 7120	1

In short, there are many research questions pertaining to Paleoindian chronology, most of which are resultant to the small size of the chronometric database. Apparent mixing of Paleoindian and later artifacts also confounds interpretations. Other basic chronological research questions that should be applied to Paleoindian components include the following:

- Determination of the when the Paleoindian occupation of western Colorado commenced.
- Determinations of whether the components represented by the various and roughly contemporaneous late Paleoindian projectile point types are actually coeval, or are chronologically sequential.
- Identification of the time of transition from Paleoindian to Archaic lifeways, and whether the transition was sequential or temporally overlapping.

Consideration of Archaeological Units

Archaeological units are constantly in need of reevaluation as the archaeological database grows. The "Paleoindian era" unit is the most encompassing unit herein considered, and has been divided into "early Paleoindian" and "late Paleoindian" units, following Reed and Metcalf (1999), to reflect important differences in lifeways and technology. The early Paleoindian units may be further divided into conventional units, such as the Clovis, Goshen, and Folsom traditions. So few excavation data are available for these units in the region that further subdivision is untenable; additionally, regional data are insufficient to address the utility of the conventional early Paleoindian traditions.

The late Paleoindian period is composed of some relatively specific archaeological units, such as the Cody complex, but such complexes are not routinely applied to western Colorado Paleoindian components. Instead, the Foothill-Mountain tradition has been used, which is seen as a generalized adaptation to mountainous regions (e.g., Reed and Metcalf 1999). Frison (1992) contrasts the Foothill-Mountain lifeway with the Plains-adapted lifeway, the latter of which is based on specialized bison procurement. Because the Colorado Plateau and the rugged portions of the Southern Rocky Mountains outside of mountain parks were characterized by relatively small, dispersed herds of bison and by species such as deer and elk that tend to be dispersed across the landscape, it is very likely that late Paleoindian adaptations were different than that of the Plains, where large bison herds were available. Direct evidence of Foothill-Mountain tradition subsistence practices in western Colorado is lacking, however. The Foothill-Mountain tradition remains a useful concept in west-central Colorado, if only to differentiate the more generalized subsistence system from that of the Plains.

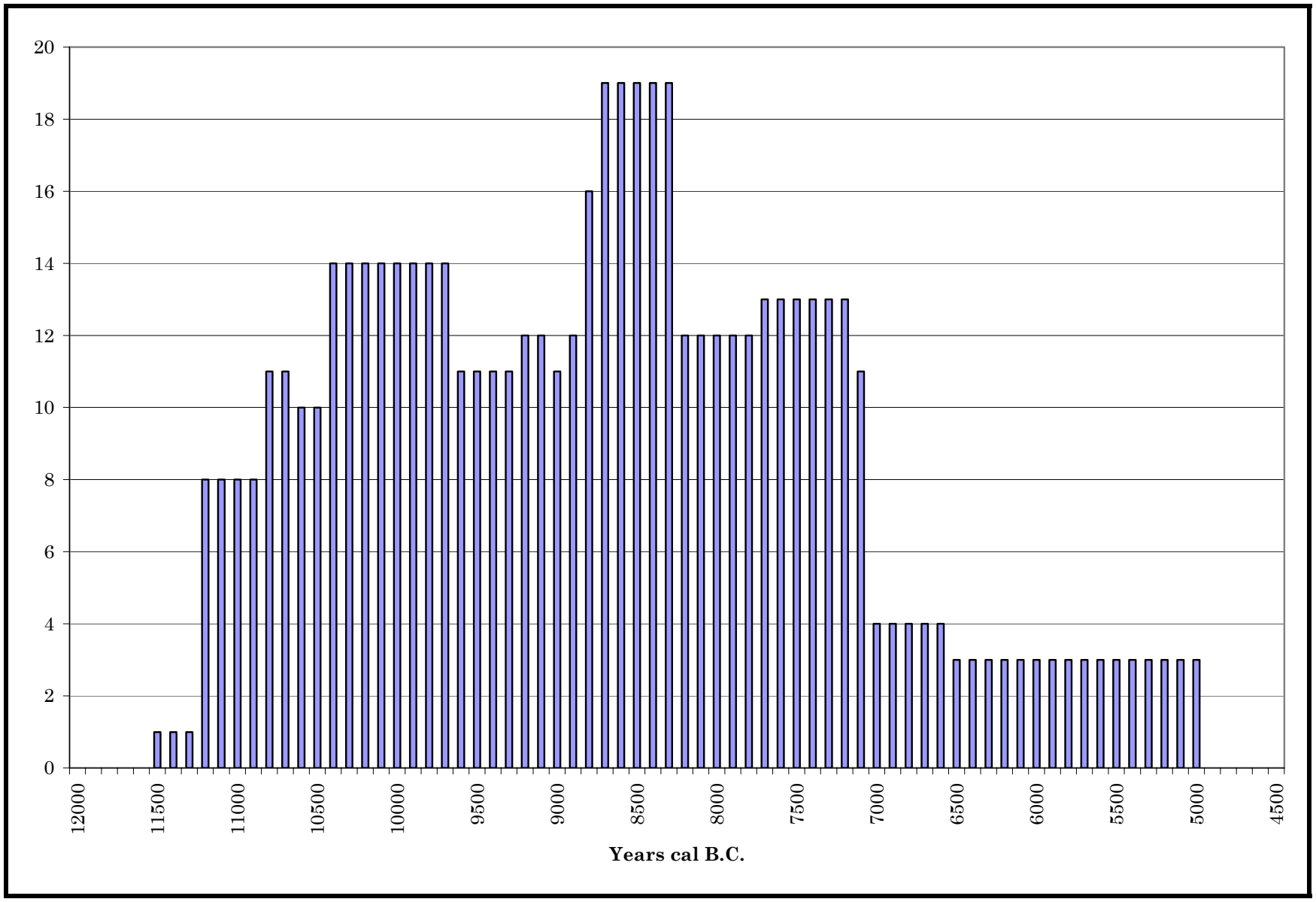


Figure 5. Age range B.C. and frequency of Paleoindian projectile point types in the UPAP study area.

In her most recent work, Pitblado (2003) scarcely makes use of the Foothill-Mountain tradition concept, perhaps recognizing the dearth of supporting subsistence data from the region. She does, however, make an argument for discrete human groups in the region during the late Paleoindian period. Based on an extensive analysis of a sample of late Paleoindian projectile points from the Intermountain West, Pitblado (2003) argues that the Southern Rocky Mountains was occupied year-round by a group of Paleoindians. Distinct populations, with different projectile point types and technology, also used or occupied the Southern Rocky Mountains; some were primarily centered on the Plains, and others were primarily centered in the Great Basin or the Colorado Plateau. Pitblado (2003) even argues that these groups had different mobility strategies, with the Great Basin and Colorado Plateau groups engaged in a more "forager" lifeway than the inhabitants of the Southern Rocky Mountains and the Plains, who were more at the "collector" end of the mobility continuum (see Binford 1980).

Pitblado (2003) does not ascribe the various late Paleoindian groups to specific archaeological units, conventional or otherwise. These unnamed groups, however, are recognized through their use of conventional late Paleoindian projectile point types. Pitblado's purported year-round residents of the Southern Rocky Mountains, for example, are believed to have manufactured Angostura points. Angostura points are more common in the Southern Rocky Mountains than any other physiographic province, though they occur in all regions in her study area (Pitblado 2003). Plains-centered groups that are thought to have seasonally exploited the mountains included the makers of Jimmy Allen/Frederick, Hell Gap, Goshen/Plainview, and Eden/Firstview projectile points. Late Paleoindian groups primarily centered in the Great Basin are recognized by Great Basin Stemmed projectile points. Other projectile point types evidence less association with particular geographic areas. Scottsbluff and Concave Base Stemmed points occur in more comparable relative frequencies in all areas. Pitblado (2003) has observed that the relative frequencies of point types vary by region, as do other point variables, including raw material preferences, degree of patterning in flaking, frequency of stem grinding, frequency of broken points, and frequency of reworking of broken points into smaller projectile points or into other tool classes (Pitblado 2003). The implication is that different groups of people made different projectile point styles. This is supported by excavation data from the Plains (e.g., Frison and Todd 1987), wherein discrete components tend to yield a limited range of projectile point types.

The Colorado Plateau late Paleoindian projectile points tend to share technological attributes with Great Basin points, in terms of size, raw material selection, and degree of craftsmanship, and other variables (Pitblado 2003). Both provinces are characterized by high relative frequencies of Great Basin Stemmed projectile points. Great Basin Stemmed points constitute 80 percent of Pitblado's sample from the Great Basin, 54 percent of the points from Great Basin Mountains, and 50 percent of the points from the Colorado Plateau. The projectile point types studied by Pitblado from the region, however, do not indicate sole association with Great Basin groups. Twenty-five percent of the late Paleoindian points from the Colorado Plateau are classified as Angostura points, compared to 41 percent of the points from the Southern Rocky Mountains, 8 percent of the points from the Great Basin Mountains, and less than 5 percent from the Great Basin and Plains. This suggests that the Angostura-producing mountain dwellers also utilized the Colorado Plateau during some periods or during some portions of their annual rounds. The Colorado Plateau point sample also contains specimens classified as Scottsbluff (8 percent), Eden/Firstview (4 percent), Concave Base Stemmed (8 percent), and Jimmy Allen/Frederick (4 percent). In Pitblado's model, these points suggest occupation of the Colorado Plateau by other groups, some of which were primarily inhabitants of the Plains. Limited temporal evidence suggests rough contemporaniety among point types (Pitblado 2003).

The relative frequencies of projectile point types found in the UPAP study area conform poorly with those derived by Pitblado (2003) from her study. As shown in **Table 16**, which includes only the most common late Paleoindian point types in Pitblado's study, the UPAP sample (n=22) has

far more Plainview/Goshen/Meserve, Hell Gap, and Scottsbluff/Cody complex, and Frederick/Jimmy Allen points than Pitblado's sample for the Colorado Plateau, and fewer Angostura points. The percentages of point types from the UPAP study area also do not compare favorably to any other physiographic province, either. The discrepancies may be due to a number of factors, including small sample sizes and interanalyst variation in point classifications. The discrepancies point out the need for additional data and for reexamination of Pitblado's conclusions concerning the frequencies of common point types on the Colorado Plateau.

Table 16. Percentages of Eight Most Common Late Paleoindian Point Types (after Pitblado 2003:129).

Point Type	Great Basin	Great Basin Mountains	Colorado Plateau	Southern Rocky Mountains	Plains	Upap Study Area
Scottsbluff	10	12	8	4	11	32
Eden/Firstview	0	2	4	9	28	4
Hell Gap	2	8	0	0	7	14
Great Basin Stemmed	80	54	50	19	1	0
Concave Base Stemmed	2	10	8	6	8	0
Goshen/Plainview	0	2	0	1	15	32
Jimmy Allen/Frederick	0	6	4	19	25	14
Angostura	5	8	25	41	3	4

Pitblado's model can be further tested when sample sizes of Paleoindian projectile points increase. Excavation data, however, will be most valuable. Research should focus on determining whether sets of sites yielding a particular type of late Paleoindian projectile point type evince less within-group variability than extra-group variability in regards to technology, settlement and subsistence, and chronology. Although a site on the Colorado Plateau with Eden points would be expected to have important differences from a Eden/Firstview site on the Plains, there should be similarities that show a common technology or lifeway that can distinguish it from a site with Great Basin Stemmed points.

The implications of Pitblado's (2003) argument for year-round occupants of the Southern Rocky Mountains also merit study. As shown above, this unit is characterized by Angostura projectile points; they are predominantly found in the Rockies, but are also relatively common on the Colorado Plateau. This implies that the Colorado Plateau was commonly part of the homeland or use area for these peoples. Whether the Colorado Plateau was commonly integrated into annual rounds, perhaps constituting winter habitation areas, or constituted more sporadic use of the area is of research interest. Mapping of the distribution of Angostura points on the Colorado Plateau might also be insightful. If the Colorado Plateau was integrated into the annual rounds of a predominantly mountain-based group, the points might be expected to be more commonly distributed along the eastern perimeter of the Colorado Plateau.

The utility of our archaeological units for describing the transition from the Paleoindian to the Archaic era is also worthy of study. Whereas traditional models purported a rather major change in lifeways from the Paleoindian stage to the Archaic stage, which involved a change from a big-game hunting focus to a generalized hunting and gathering lifeway based on both plant and animal exploitation, recent interpretations downplay the differences. Simms (1988), for example, suggests that the Paleoindian and Archaic lifeways were relatively similar in the Great Basin. The Foothill-Mountain tradition concept, which has been applied to west-central Colorado (e.g., Pitblado 1993; Reed and Metcalf 1999), also implies general similarities between the late Paleoindian and early Archaic lifeways, by asserting that the late Paleoindian subsistence practices were more generalized than the Paleoindian bison-hunting groups of the Plains and the high mountain parks. Schroedl (1991) even suggests that Archaic lifeways and technology developed in the lower

elevations, at times when the late Paleoindian groups had followed megafauna into higher elevation refugia in the face of a warming environment. Addressing the nature of the transition will require well-dated components from the period in question with both artifacts and ecofacts indicative of subsistence practices.

In summary, investigation of Paleoindian archaeological units is desirable and will be possible as additional Paleoindian components are investigated. The Foothill-Mountain tradition is especially worthy of examination, because it is a relatively new unit whose validity, ultimately, will depend of excavated subsistence and technological data. The unnamed units that Pitblado (2003) applies to sites yielding late Paleoindian projectile points also merits theoretical and empirical examination. To imply that widely distributed sites with common projectile point types represent some degree of cultural linkage is often risky (Emberling 1997).

Settlement Patterns

To understand Paleoindian settlement patterns, it is necessary to consider the region's paleoenvironmental context. Climatic conditions were substantially different than today's during the late Pleistocene and early Holocene, so a site now in one vegetation zone may have actually been within a vegetation zone currently characterizing a higher elevation setting. During the Pleistocene's last full glacial advance between cal 19,500 and 17,200 B.C., the climate was much cooler than today's, and there was less annual temperature variation. The cooler temperatures may have depressed vegetation zones up to 500 m in mountain settings (Madsen and Currey 1979). Evidence from the Unaweep Canyon area on the Uncompahgre Plateau suggests that glaciers occurred atop the plateau, possibly at this time (see Cole and Young 1983). Following approximately cal 13,400 B.C., annual temperature variation increased and temperatures increased. Vegetation ecotones probably receded in terms of elevation. A minor glacial resurgence, referred to elsewhere as the Younger Dryas, may have been manifest between cal 11,300 and 10,000 B.C. (Madsen 2000). By approximately cal 8800 B.C., the Rocky Mountains had essentially deglaciated (Andrews et al. 1975). Conditions were generally cool until approximately cal 7600 B.C., however. The period following cal 7600 B.C. was substantially warmer and dryer, a trend that continued throughout the rest of the early Holocene (Andrews et al. 1975). The distribution of modern vegetation zones was probably established after cal 7600 B.C., though Benedict (1985) suggests a date of cal 8800 B.C. for this event. Fluctuations since have been of a comparatively minor scale.

The distribution of vegetation zones is probably closely related to the distribution of Paleoindian sites. Citing the work of Kelly (1983), Pitblado (2003) has calculated indices that reflect the amount of plant and animal food available in various major vegetation zones. It is likely that the vegetation zones with the greatest densities of potential foods would have been the most intensively occupied or exploited by prehistoric peoples, as encounter rates with desirable resources would have been highest. The primary product/primary biomass index shown on Table 17 reflects the available energy from new plant tissue, so is a measure of the quantity of potential plant foods. The index is superior to a simple measure of plant biomass per unit of area, because some vegetation zones, such as evergreen forests, have very high biomass that is "locked-up" as wood, which is inedible to most species. The secondary biomass/primary biomass index reflects the general availability of animals within a zone. As shown in Table 17, the swamp/marsh zone is clearly has the most available flora and fauna, followed by the temperate grassland. Woodland/scrublands, tundra, and desert/ semidesert zones are less productive, and the temperate evergreen forest has the least available food.

Currently, the UPAP study area is dominated by just four of the major vegetation zones (Soil Conservation Service 1972). The lowest portions of the Uncompahgre Plateau's eastern flank are within the desert/semidesert zone, an area dominated by greasewood and saltbush. Just upslope and encircling the Uncompahgre Plateau is the woodland/scrubland zone, locally dominated by pinyon and juniper. Higher still, the temperate evergreen forest is found, dominated by ponderosa

pine, Gambel oak, Douglas fir, blue spruce, stands of aspen, and fescue grassland parks. The tundra and temperate grassland zones do not occur within the study area, though they may have in the past. The swamp/marsh zone is uncommon and is limited to small areas around highland springs and ponds.

Table 17. Edible Biomass Ranking of Regional Vegetation Zones (from Pitblado 2003:47).

Vegetation Zone	Primary Product/ Primary Biomass Index	Ranking For Plant Food Potential	Secondary Biomass/ Primary Biomass Index	Ranking For Animal Food Potential
Temperate Grassland	0.38	2	4.3	2
Woodland/Scrubland	0.12	4	0.8	3
Temperate Evergreen Forest	0.04	6	0.2	6
Tundra	0.23	3	0.7	4
Desert/Semidesert	0.13	5	0.7	4
Swamp/Marsh	1.33	1	6.6	1

Distribution maps of vegetation zones during the late Pleistocene and early Holocene are unavailable. At some point, the top of the Uncompahgre Plateau may have been glaciated, which would have rendered much or all of the highest elevations inaccessible to humans. Tundra may have surrounded the glaciers, and much of the lower portions of the plateau may have been forested by evergreens. As more modern climatic regimes evolved after approximately cal 8100 B.C., vegetation zone boundaries shifted upslope, eventually displacing tundra and resulting in modern distributions. Because the distribution of modern vegetation zones probably poorly reflects the distribution of vegetation zones during the Paleoindian era, it is untenable to examine Paleoindian site and isolated find distributions in terms of modern vegetation zones. Site elevation is probably related to terminal Pleistocene and early Holocene vegetation zones, and will be examined below.

Paleoenvironmental models suggest that early and late Paleoindian site distributions may be different because of environmental changes. By approximately 13,000 B.P, the time that humans probably first entered the area, vegetation zones had already begun receding upslope. Glaciers were probably gone and the highest reaches of the Uncompahgre Plateau were probably either covered by tundra or by evergreen forests. The entire plateau was probably available for human use. If tundra prevailed, then the higher elevations may have been moderately attractive for human use, as moderate quantities of potentially edible plants and animals were available. If tundra was extensive, then it is also possible that large herd animals were present, which may have been especially appealing to the early Paleoindians, with their subsistence and settlement focus on big game hunting. Moderate or high site densities might be expected if this were the case. If the higher elevations during the early Paleoindian era were covered by extensive evergreen forests, instead, then these areas might have been much less desirable, due relatively low densities of potential foodstuffs and the associated difficulty of hunting dispersed game in forest cover. Relatively low densities of early Paleoindian sites would be expected in the higher elevations in this scenario. It is possible, however, that the lower elevations were covered by the woodland/scrubland zone, which, with higher potential for edible plants and animals, might have been more conducive for human use. The presence of relatively high densities of early Paleoindian sites in the lower elevations might be an indication of this.

The late Paleoindian era, between approximately cal 12,000 and 7600 B.C., was initially affected by the period of glacial resurgence between 11,200 and 10,100 B.P, followed by a warming trend. Evergreen forests may have dominated the higher elevations, with woodland/scrubland on the lower flanks of the Uncompahgre Plateau. If this model is correct, then the higher elevations may have been available but relatively unattractive for human use throughout the late portion of the

Paleoindian era. The lower areas, with greater potential for edible plants and animals, might have received more attention, and might evince higher site densities.

The Paleoindian artifacts found in the study area permit a tentative test of the settlement model suggested by paleoenvironmental trends. The sample of Paleoindian artifacts is small, however, so results should be regarded with caution. Some apparent patterns may simply reflect sample error. As shown in **Table 18**, which considers only those sites or isolated finds that are reported by type, early Paleoindian period points occur in the 5,000 – 6,000 ft (1,524-1,829 m) and the 7,000 – 8,000 ft (2,134-2,438 m) zones. Their absence in other zones may be due to small sample size. The late Paleoindian period artifacts tend to support the trends tentatively suggested by the early Paleoindian point distributions, in that none occur below 5,000 ft (1,524 m) nor above 8,000 ft 2,438 m).

Table 18. Distribution of Paleoindian Artifacts by Elevation Zone.

Elevation Zone (Ft)	Elevation Zone (M)	Early Period	Late Period	Combined Periods
Below 5,000	Below 1,524	0	0	0
5,000 – 6,000	1,524 – 1,829	2	4	6
6,000 – 7,000	1,829 – 2,134	0	10	10
7,000 – 8,000	2,134 – 2,438	2	11	13
Above 8,000	Above 2,438	0	0	0

If Paleoindian sites and isolated finds were randomly distributed across the study area, their relative frequencies would be similar to the percentages that the elevation zones constitute of the UPAP study area. To test this, the percentages that the various elevation zones comprise of the study area were calculated by GIS software (**Table 19**). The data indicate that most of the study area is between 5,000 and 9,000 ft (1,524-2,743 m) elevation. The most striking trend is the lack of Paleoindian sites or isolated finds above 8,000 ft (2,438 m) elevation, in either the early or the late Paleoindian periods. Sixteen percent of the finds might be expected in these higher zones. This suggests that the highest elevations of the Uncompahgre Plateau were not especially attractive to Paleoindian peoples. Whether this reflects sampling bias, poor site visibility in the modern evergreen forests and grassland parks, perceived low value of the plant and animal resources in the higher portions of the plateau during the Paleoindian era, or limitations of accessibility due to snow cover in the cooler months cannot yet be determined. The data also indicate that a disproportionate quantity of the Paleoindian discoveries occurs between approximately 6,000 and 8,000 ft (1,829-2,438 m) elevation, and that the Paleoindian artifacts are scarcer than expected below 6,000 ft (1,829 m). The paucity of Paleoindian artifacts below 6,000 ft (1,829 m) may, in part, reflect sample bias related to land ownership and reduced site visibility resultant from extensive agricultural and residential development of the lowland valleys.

Paleoindian site and isolated find distributions should be different than sites of other archaeological units, because vegetation zones – each with different quantities of available food resources – were differently distributed during that era. Because the climate during the Paleoindian era was cooler and moister conditions than during subsequent eras, and because vegetation zones are somewhat tied to elevation, it seems plausible that Paleoindian artifacts would be found in lower elevation zones than artifacts of later components. This is because the vegetation zones listed in Table 17 that occur in the highest elevations – tundra and temperate evergreen forest – rank relatively low in food productivity. The woodlands/scrublands of the lower elevations (and, possibly, temperate grasslands) are more productive, and would have probably been the primary locus of settlement. The lowest elevation zone may have been desert-like, and so would have been relatively unattractive.

In short, this model supposes that Paleoindian occupation of the Uncompahgre Plateau was most intensive between 6,000 and 8,000 ft (1,829-2,438 m) elevation because that zone was vegetated

with a relatively highly productive ecosystem. Paleoenvironmental sampling is necessary to discern the nature of the vegetation by elevation zone on the Uncompahgre Plateau during the terminal Pleistocene/early Holocene period, and so permit testing of this hypothesis. It follows that later occupations would be dissimilarly distributed by elevation zone, because vegetation zones shifted upslope following the Paleoindian era. To test this, the relative frequency of sites attributed to later archaeological units is compared to the Paleoindian artifacts, in terms of elevation. This shows that the later groups occupied more intensively the 6,000 to 7,000 ft (1,829-2,134 m) zone, and that the Paleoindians more intensively utilized the 7,000 to 8,000 ft (2,134-2,438 m) zone. Later groups also more intensively occupied elevations above 8,000 ft (2,438 m) than did the Paleoindians. These patterns suggest that the elevations above 8,000 ft (2,438 m) were less productive in terms of food resources during the Paleoindian era, but that the environment just below the unproductive belt was favored by Paleoindians. The lowest elevation zones were comparatively less attractive during all eras.

Table 19. Elevations of Paleoindian Sites and Isolated Finds with Diagnostic Artifacts.

Elevation Zone (Ft)	Elevation Zone (M)	Elevation Zone Percentage Of Study Area	Percent Of Paleoindian Sites And Ifs	Percent Of Later Prehistoric Sites
Less than 5,000	Less than 1,524	6	0	1
5,000 – 6,000	1,524 -- 1,829	23	15	14
6,001 – 7,000	1,829 – 2,134	29	37	45
7,001 – 8,000	2,134 – 2,438	25	48	25
8,000 – 9,000	2,438 – 2,743	16	0	11
Above 9,000	Above 2,743	1	0	3

As shown in Figure 2, sites and isolated finds with diagnostic Paleoindian artifacts are scattered across the UPAP study area. As suggested by the elevation data presented above, the higher elevations have lower frequencies of Paleoindian artifacts; such areas are depicted as National Forest lands on the illustration. The paleoenvironmental or cultural reasons why the highest elevations in the study area were not as intensively inhabited as the lower elevations needs to be explored. Certainly, high elevation Paleoindian sites have been documented in other areas, such as the San Luis Valley region (see Jodry 1999).

The Paleoindian models presented above can be tested with additional survey-level data and, most importantly, with excavation data. Other lines of research are also applicable. As indicated by Reed and Metcalf (1999), Kelly and Todd's (1988) settlement model for the early Paleoindian period is testable. This model states that the early Paleoindians practiced a highly mobile foraging lifeway focused on big-game hunting, the likes of which were never repeated. Reed and Metcalf also summarize York (1991) and Schroedl's (1991) late Paleoindian period settlement models, which assert that the higher elevations served as refuge for Pleistocene megafauna, as warming climates squeezed the environmental settings most suitable for the animals upward. Late Paleoindian period peoples followed the megafauna. Data from the UPAP study area will contribute to the analysis of these settlement models.

Technology

Aside from projectile points, almost nothing is known about the technology of the Paleoindian inhabitants of the study area. No Paleoindian architecture has been found, though Western State College has recently discovered a Folsom habitation structure at the Mountaineer site near Gunnison (Mark Stiger, 2002 personal communication to A. D. Reed). With only a single excavated Paleoindian component in the UPAP study area, our understanding of the variability in Paleoindian artifacts is very limited. Because two spatially overlapping components were present at the Broken Leg site, researchers could only confidently attribute diagnostic projectile points and

scrapers to the Paleoindian component (Firor 2001). Five Paleoindian projectile points were found at the site's Paleoindian component. All were lanceolate with moderately to deeply concave bases. Lateral edges of the bases were straight and were ground. Some of the points evinced parallel-oblique flaking patterns. Firor (2001) compares the points to the Jimmy Allen or Frederick types,

Figure 6. Distribution of Paleoindian sites and isolated finds.

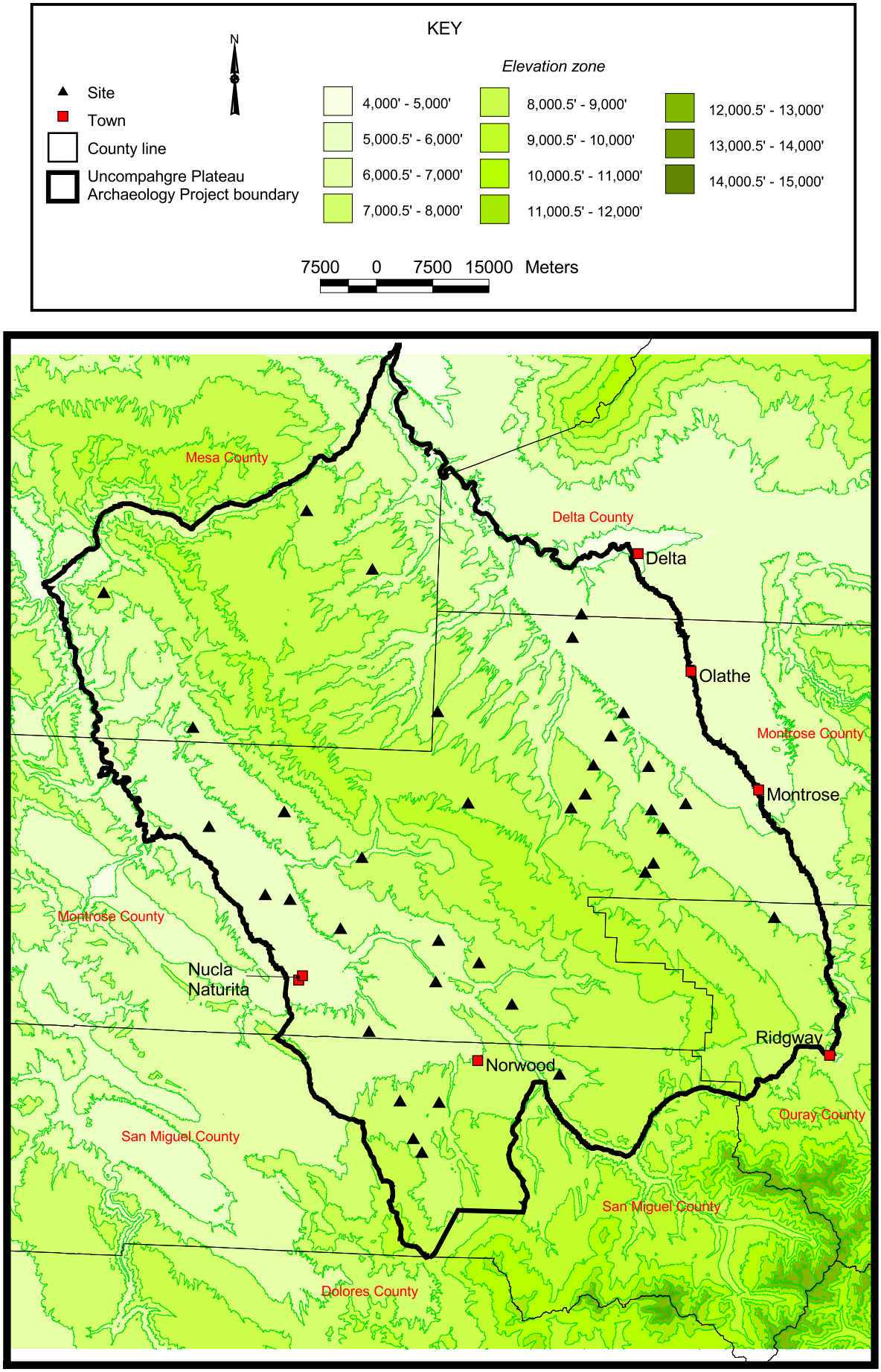


Figure 6. Distribution of Paleoindian sites and isolated finds.

and attributes them to the Foothill-Mountain tradition. A spurred scraper and a retouched flake from the site were also attributed to the site's Paleoindian component. Pitblado (2003) currently attributes Jimmy Allen/Frederick points to a Plains' oriented group that may have seasonally occupied the Southern Rocky Mountains. She notes small quantities of Jimmy Allen/Frederick points on the Colorado Plateau and in the Great Basin mountains.

Other Paleoindian artifacts found in the study area consist of surface finds of projectile points. The early Paleoindian projectile points, such as Clovis, Goshen, and Folsom, evidence remarkable consistency in style over broad portions of the United States (Kelly and Todd 1988; Schroedl 1991). The relative homogeneity of point styles provides the basis for Kelly and Todd's (1988) assertion that the early Paleoindian period represented a highly mobile big-game hunting lifeway that was continental in scope. It is likely that the early Paleoindian projectile points found in the UPAP study area will be similar to the conventional types defined elsewhere in the West. Other common early Paleoindian artifact classes, such as end scrapers, spurred scrapers, beaked gravers, burins, and bifaces, are also likely to occur in the study area and are likely to conform to the styles observed outside the region (see Kelly and Todd 1988).

Pitblado (2003) has developed a model of late Paleoindian technology based on Bleed's (1986) concept to "reliable" and "maintainable" tool technologies. Reliable technologies produce artifacts that are "overdesigned," highly standardized, and that exhibit excellent craftsmanship. Such tools tend to be manufactured by specialists in advance of subsistence forays that focus on a restricted set of resource objectives. Projectile points produced in a reliable system tend to be discarded when damaged, rather than reworked into other tools or into smaller points. The payoff resultant from the high investment in production labor comes with excellent tool performance during procurement of the desired resource. Maintainable technology exhibits less investment of production labor. Such tools tend to be light and portable and are more easily produced. They are easily produced and maintained by their users. Maintainable technology is usually associated with more generalized subsistence strategies, in which a broader range of food resources are anticipated, in a wider setting and over a longer period of time.

Pitblado (2003) examined late Paleoindian projectile point attributes and concludes that some types represent reliable technologies (e.g., Eden/Firstview), whereas others represent maintainable technologies (e.g., Great Basin Stemmed). It seems plausible that there was a continuum of reliable and maintainable technologies during the Paleoindian era. At one end of the continuum were the early Paleoindian projectile point types, such as Clovis and Folsom. These projectile points were highly standardized and well-crafted, and were well suited for an adaptive strategy focused intensively on big-game hunting. They undoubtedly represent components of a reliable system. Reliable technologies, based on Pitblado's data, seem to have persisted into the late Paleoindian period, as represented by types such as Eden/Firstview. Maintainable technologies may have appeared during the late Paleoindian period, with the appearance of more crude projectile point types like Great Basin Stemmed. This line of research, however, could benefit from further analysis.

Because Pitblado's discussion of reliable and maintainable technologies focuses only on projectile points, it may be risky to assume that such classifications apply to other artifact classes. Failure of a projectile point during a bison hunt probably had more ramifications than failure of a scraper used to process an animal procured by the hunt. It may be more tenable to assume that the two technological strategies applied primarily to the tools of the hunt. The differences in projectile point technologies observed by Pitblado (2003) probably better reflect overall subsistence reliance on specialized big-game hunts, where specific types of animals were hunted. If so, the nonperishable material culture from late Paleoindian sites

that are not directly related to hunting should be similar between sites with projectile points of differing projectile point types and hunting strategies.

To summarize, regional data are sorely needed to address the technology of the Paleoindian era. Important research will include comparing and contrasting Paleoindian assemblages to those excavated in other regions and determination of whether point types attributed to reliable or maintainable systems reflect meaningful differences in subsistence practices or logistical organization. Following the suggestions of Reed and Metcalf (1999), technological research should also examine the relationship of Paleoindian lithic technology and group mobility.

Subsistence

Little is known about the subsistence practices of the Paleoindian inhabitants of the UPAP study area. The single excavated Paleoindian site – the Broken Leg site (5SM2423) – yielded no direct subsistence data. The site's two excavated hearths yielded juniper fuel wood, but no burned seeds and no bone (Firor 2001). Artifacts from the component indirectly provide insight into site subsistence practices. Debitage, spear points, and a scraper were recovered. These artifacts suggest an emphasis on hunting and animal processing. No ground stone artifacts were recovered. The absence of ground stone may reflect sampling error or a site focus on hunting. Even a site focus on hunting at the Broken Leg site does not negate the possibility that plant gathering was important at other sites occupied during the people's seasonal rounds.

Regional data also provide little insight into Paleoindian subsistence practices, again due to the dearth of excavated Paleoindian components. As discussed by Reed and Metcalf (1999), current subsistence models suggest that subsistence foci were different during the early and the late Paleoindian periods. Kelly and Todd (1988) assert that early Paleoindians focused on highly ranked big game animals. Peoples were highly mobile foragers, moving from one game concentration to another. During the late Paleoindian period, a more regionally specialized adaptation may have developed, utilizing more dispersed big game, but also exploiting plants to a larger degree. This more "generalist" approach is a key component of Frison's (1992) and Pitblado's (1993) Foothill Mountain tradition. Direct subsistence data of Paleoindian subsistence is absent in the Great Basin and rare in western Colorado (Schroedl 1991; Reed and Metcalf 1999). An important research goal of future excavations of Paleoindian components should be to extract direct evidence of subsistence, in the form of burned seeds, pollen, and animal bones, and to compare and contrast those data between collections from various archaeological units.

Analysis of whether groups producing projectile points as part of reliable or maintenance technological systems had different hunting strategies is also appropriate. It is hypothesized that sites with a reliable system of projectile point production (e.g., Folsom or Eden/Firstview) should evidence a subsistence focus on a highly restricted set of faunal foodstuffs. Sites with maintainable system projectile points, in contrast, should yield a broader set of fauna, especially those that are dispersed either across space or through the annual cycle.

In short, obtaining direct subsistence data is an important research goal for the Paleoindian era. Such data are important for establishing whether the Foothill-Mountain tradition actually represents a more generalized hunting and gathering subsistence strategy than late Paleoindian complexes of the Plains, and whether some late Paleoindian groups in the region practiced a more generalized subsistence strategy than others.

Paleoenvironment

As alluded to in the section above titled Settlement Patterns, paleoenvironmental reconstructions are more important for Paleoindian research than for all subsequent archaeological units. This is because the environment at the end of the Pleistocene and during the early Holocene was more different than today's environment than during any subsequent period. Because climatic conditions were generally cooler and moister during the Paleoindian era, vegetation zones were lower in elevation. Although these trends can be deduced from paleoenvironmental data from other regions, little is actually known about the distribution of vegetation zoned during various periods within the Paleoindian era. Paleoenvironmental research is needed to improve the quality of interpretations of Paleoindian settlement and subsistence practices.

Particularly Important Sites

Because so few Paleoindian sites have been recorded in the region, and because of the dearth of regional excavation data, any Paleoindian site with contextual integrity should be considered a particularly important cultural resource. The Broken Leg site (5SM2423), the only excavated Paleoindian site in the study area and the only demonstrated component of that age, retains the potential to yield additional Paleoindian materials and should be regarded as an important site.

Chapter 5
Archaic Era: Context and Research Design

Introduction

The Archaic era dates between cal 7300 B.C. and 400 B.C.. (Reed and Metcalf 1999). The transition from the Paleoindian era and the Archaic era is marked by a transition to a more mobile, broad-based, hunter-gatherer lifeway. The Archaic era includes a foraging strategy based on winter habitation areas, an increase in plant processing, and the use of stemmed and notched projectile point types. The end of the era is characterized by experiments with new subsistence patterns including corn horticulture and a shift toward seed processing. (Reed and Metcalf 1999).

A paleoenvironmental model from the Indian Creek site, just outside the UPAP study area, suggests that the climate fluctuated between warm/dry and cool/moist conditions during the Archaic era (Horn et al. 1987). Between cal 5900 and 4300 B.C., the region experienced warm and dry conditions. The following 1,000 years was much cooler followed by a series of shorter warming and cooling trends through the end of the era. Radiocarbon data for the Northern Colorado Basin indicates that higher elevations had greater occupation during the period of maximum temperatures (Reed and Metcalf 1999).

Quality of the Database

There are 348 identified Archaic sites in the UPAP study area (Table 20). These sites include roughly 12 percent of the 3,000 sites in the area. The vast majority (93 percent) of the sites are open artifact scatters. Sheltered artifact scatters make up 4 percent of the sites. This is consistent with the mobile, hunting and gathering strategy employed during this time.

Of these sites, 12 components have been chronometrically dated. Some of these sites have good excavation data, giving us a view of life during the Archaic. The database includes sites from all four periods of the Archaic. All the sites are located within a 2,000 ft (609 m) elevation range, between 5,280 ft and 7,140 ft (1,609-2,176 m), the majority of which are in or very close to pinyon-juniper woodland (Table 21). To understand the changes in occupation and mobility throughout the 6,000 years of the Archaic era, the database needs to include more excavated sites in both higher and lower elevations. The larger survey database of 348 sites includes sites in a wider range of elevations. Is it merely coincidental that the sites with datable Archaic components all fall within a narrow elevation and vegetation zone, or do these sites merely have more visible features, offering greater incentive to excavate them? Perhaps the higher and lower sites are more ephemeral and difficult to locate.

Table 20. Archaic Sites in the Uncompahgre Plateau Study Area.

Site Type	Count	Percentage
Lithic Procurement	6	1.7%
Open Architectural	1	0.3%
Open Artifact Scatter	323	92.8%
Open Artifact Scatter; Rock Art	1	0.3%
Rock Art	2	0.6%
Sheltered Artifact Scatter	14	4.0%
Sheltered Artifact Scatter; Rock Art	1	0.3%
Total	**348**	**100.0%**

Table 21. Elevations of Dated Archaic Sites in the Study Area.

Site	Period	Vegetation Zone	Elevation
Christmas Rockshelter (5DT2)	Pioneer Period	Sagebrush Scrub	5,280 ft
Harris Site (5MN2341)	Transitional/Terminal Periods	Scrub/Woodland	5,830 ft
Shavano Springs Site (5MN40)	Terminal Period	Scrub/Woodland	6,070 ft
Coalbank Canyon Site (5MN3895) Settled Component	Settled Period	Scrub/Woodland	6,200 ft
Coalbank Canyon Site (5MN3895) Mixed Component	Late Archaic/Early Formative	Scrub/Woodland	6,200 ft
5MN273	Transitional Period	Scrub/Woodland	6,213 ft
Schmidt Site (5MN4253)	Terminal Period	Scrub/Woodland	6,440 ft
Simpson Wickiup Site (5SM2425) Component 1	Pioneer/ Settled Periods	Scrub/Woodland	6,500 ft
Simpson Wickiup Site (5SM2425) Component 2	Transitional Period	Scrub/Woodland	6,500 ft
5SM2427	Pioneer Period	Lower Woodland	6,600 ft
5OR317	Transitional Period	Lower Woodland	6,755 ft
Sanburg Site (5MN43)	Terminal Period	Lower Woodland	7,140 ft

The lack of detailed floral and faunal data in some of the sites excavated over 20 years ago leaves a gap in our understanding of subsistence at these sites. In addition, debitage was often not collected, making it difficult for us to discern lithic reduction strategies and mobility. More recent excavated sites would provide a wider range of data to aid in our understanding of the occupants of the Uncompahgre Plateau during the Archaic era.

The quality of the Archaic database would certainly benefit by the identification and dating of Archaic components in a wider range of elevations and a broader range of vegetation zones. The inclusion of these sites would provide us with a greater understanding of the full range of the settlement patterns both within the Archaic era and among its different periods.

Excavated and Dated Archaic Sites on the Uncompahgre Plateau

Christmas Rockshelter (5DT2)

The Christmas Rockshelter was one of 36 prehistoric sites excavated within the UPAP study area by William G. Buckles as part of the Ute Prehistory Project (1971). At an elevation of 5,280 ft (1,609 m), it is in the sagebrush/scrub vegetation zone, roughly 1,000 ft (305 m) lower than the scrub/woodland zone.

This site is the lowest of the excavated sites in the project area. The site was occupied repeatedly from the Archaic era through Historic times. The radiocarbon dates places the Archaic component within the Pioneer period (cal 7300-5400 B.C.). Features of the Archaic occupations consisted of slab-lined thermal features; the artifact assemblage included projectile points, flaked stone tools, and ground stone tools. Floral and faunal information was not reported. Buckles suggested that it was possibly a winter-oriented site because of its low elevation.

Shavano Springs (5MN40)

The Shavano Springs site is another site from Buckles's (1971) Ute Prehistory Project. Buckles considered it a temporary camp. The features include unlined fire pits, and the artifact assemblage is focused mostly on biface reduction. The site is at an elevation of 6,070 ft (1,850 m). The radiocarbon dates places the site within the Terminal period (cal 1200-400 B.C.).

Sanburg Site (5MN43)

The Sanburg site is another Archaic site from Buckles' (1971) Ute Prehistory Project that falls within the study area. The rockshelter is part of the rimrock on top of Monitor Mesa at an elevation of 7,140 ft (2,176 m); vegetation is dominated by pinyon-juniper woodland. The site reportedly has deep midden deposits, and the assemblage includes both biface and flake tools. There was a large number of manos at this site, which were lost before they could be counted or analyzed. Neither floral nor faunal remains were reported. The radiocarbon date puts this site within the Terminal period (cal 1200-400 B.C.).

Coalbank Canyon Site (5MN3859)

The Coalbank Canyon site was excavated as a part of the TransColorado Project (Kalasz et al. 2001). The vegetation at the site is dominated by sagebrush, but an edge of the site extends into a stand of pinyons and junipers. The Coalbank Canyon site is located on a gentle slope of a low ridge at 6,200 ft (1,890 m). There were two Archaic components at this site.

The Settled period (cal 5400-3200 B.C.) component contained minimally modified ground stone of locally available materials. Analysis suggests that these tools were used for the processing of wild seeds and nuts. Associated with the ground stone tools were formal slab-lined basins. The faunal and floral assemblages were sparse. Different areas of the site contained flaked stone indicative of different stages of biface reduction. It was suggested that this site was used as a temporary seasonal camp oriented toward limited plant processing and considerable flaked stone production activities.

The second component is a mixed Archaic and Early Formative component. The radiocarbon dates for this component are indicative of the late Settled (cal 5400-3200 B.C.), Transitional (cal 3200-1200 B.C.), and Terminal periods (cal 1200-400 B.C.). The diagnostic projectile points were mostly from the Settled period, including Mallory, Northern, and San Rafael Side-notched, Humboldt Concave base, and McKean Lanceolate points. This component contained a variety of features from simple unlined basins to formally constructed slab-lined basins. The unlined basins are associated with the Settled and Transitional period dates. The biface production is similar to that of the earlier component. The ground stone tools are similar to the earlier component but much more abundant. Despite the abundance of thermal features and ground stone, the floral and faunal remains are sparse. As with the Settled period component, this mixed component was most likely a short-term, specialized task encampment.

Simpson Wickiup Site (5SM2425)

The Simpson Wickiup site is on the eastern rim of a canyon, on a low-lying pinyon and juniper-covered ridge at approximately 6,500 ft (1,981 m) elevation. This site was excavated as part of the TransColorado Pipeline project (Greubel 2001). There are two Archaic components at the site.

The first component consisted of a minimum of two occupations over 700 years (cal 4770-4040 B.C.) in the Settled (cal 5400-3200 B.C.) period. The three features attributed to this component were all slab-lined thermal features. The lithic assemblage included both biface and core reduction technologies. Sandstone grinding slabs were associated with the thermal features. The faunal and floral evidence is sparse, but the features indicate that the site may have been used as a short-term camp focused on collecting and processing vegetal food resources. The characteristics of the component suggest that the settlement pattern was most consistent with a foraging economy based on residential mobility.

Component 2 was dated between cal 2460 and 2040 B.C., falling within the Transitional period. Like the earlier component, this was a short-term field camp. The lithic technology was indicative of biface reduction, and there were no ground stone artifacts. A partially slab-lined hearth

was present, but faunal and floral remains were sparse. The lithic assemblage and lack of ground stone suggest that this was a short-term hunting oriented camp consistent with logistical mobility rather than the residential mobility of the earlier component.

The Harris Site (5MN2341)

The Harris site was excavated as a joint project between the Bureau of Land Management and the Chipeta Chapter of the Colorado Historical Society (Tucker and CAS 1989). The site is located on the edge of the pinyon-juniper woodland community and also includes open sagebrush areas at an elevation of 5,830 ft (1,777 m). Feature 2 returned a radiocarbon date of cal 2030-1520 B.C. (Beta-26648), falling within the Transitional period. The lithic assemblage included both biface and core reduction technologies. There was an abundance of ground stone in all levels. Faunal remains of medium and large animals were abundant, most of it which was recovered from Archaic levels. Floral remains were sparse, but the presence of ground stone suggests that vegetal processing was important in all levels.

5OR317

Site 5OR317 was excavated as part of the Dallas Creek Project (Muceus and Lawrence 1986). The site is located on a terrace, west of the Uncompahgre River, at an elevation of 6,755 ft (2,059 m). Ground stone at the site was expedient. The flaked stone discussion did not differentiate between components, but both core and biface reduction technologies were present at the site. The faunal remains represent one individual artiodactyl and the floral remains consisted of *Pinus* sp. from a hearth that was most likely used for fuel. No floral food sources were identified.

Muceus and Lawrence have identified this site as a campsite occupied between the Late Archaic and Late Prehistoric eras. The radiocarbon date associated with the Archaic component places the site's occupation in the Transitional period (cal 2915-2464 B.C.).

Additional Dated Sites

Additional sites within the study area have been subject to limited data recovery and have provided radiocarbon dates from the Archaic era. Three sites from the TransColorado project and one site investigated by the Grand River Institute are listed below.

5MN273

Site 5MN273, from the TransColorado Project (Eckman et al. 2001), is on the southern end of a pinyon and juniper-covered bench at an elevation of 6,213 ft (1,894 m). One thermal feature at the site was a shallow, basin-shaped thermal feature with tabular sandstone in the fill. The radiocarbon age range of the feature was cal 2200-1760 B.C. (Beta-130975), placing the site within the Transitional period. Based on the limited assemblage and features recorded, it was suggested that this was a probable campsite.

Schmidt Site (5MN4253)

The Schmidt site is located on a ridge top overlooking Wright's Mesa at an elevation of 6,440 ft (1,963 m) (Greubel and Cater 2001). A roasting pit, dating to cal 1260-850 B.C. (Beta-130989), was located during the monitoring phase of the TransColorado project. This feature was probably used during the Terminal period. It is unknown whether this feature is associated with the occupations encountered during the data recovery phase at the site. This date was far earlier than any other at this Formative and Protohistoric era site.

5SM2427

Another site from the TransColorado project, site 5SM2427, is a multicomponent lithic scatter and campsite. The site is at an elevation of 6,600 ft (2,012 m) within the pinyon-juniper woodland. Feature 8, an earthen-lined hearth, provided a radiocarbon date range of cal 4990-4550 B.C. (Beta-131028). This date places the Archaic component of the site in the Settled period. This feature also included debitage consistent with late stage biface reduction.

5MN3760

Site 5MN3760, investigated by the Grand River Institute (Conner and Hutchins 1992), is located on a flat, north-sloping mesa overlooking the San Miguel River at an elevation of 5,926 ft (1,806 m). A cobble-filled, basin-shaped hearth provided a radiocarbon date range of cal 1000-560 B.C. (Beta-49464), placing it within the Terminal period. A bifacially pecked slab metate was imbedded along the rim of the hearth, and a bifacially worn, shaped mano was found within the cobble fill of the feature.

Modeling the Archaic Era Occupation

Chronology

For years, the Archaic of the Rocky Mountain region was referred to in terms of the Plains and Great Basin Archaic. None of these were very useful for the high elevations of western Colorado. Based on local data from within and around the Uncompahgre study area, Reed and Metcalf (1999) established four periods for the Archaic. These periods are based on the distribution of traits such as projectile point styles, cooking and storage pit morphology, habitation structure types, and ground stone technology. As mentioned earlier, the Pioneer period (cal 7300-5400 B.C.) is a transitional period from the Paleoindian lifeway to the Archaic patterns. The Settled period (cal 5400-3200 B.C.) is distinguished by an increase in processing features at sites and a foraging strategy based on winter habitation areas. The Transitional period (cal 3200-1200 B.C.) includes more variability in material culture and more seasonality in the high elevations. The Terminal period (cal 1200-400 B.C.) is a transitional period between the Archaic lifeway and the Formative era. It is characterized by experiments with new subsistence patterns (Reed and Metcalf 1999). More examination of dated sites within each of these periods would add to the understanding of the different periods within the Archaic era and the Archaic era as a whole.

The nine excavated, chronometrically dated Archaic components are spread out among all four periods, although there appear to be gaps in radiocarbon dates within the Settled period (Figure 7) (Table 22). Intensity of occupation seems to be weighted toward the latter half of the Archaic, but this might also be skewed by the nature of sites that were chosen for excavation. A paleoenvironmental model for the Indian Creek site, near the town of Whitewater, Colorado, at the northern edge of the study area, suggests that a warming trend was in effect for the area (Horn et al. 1987: Figure 2.1). Warming and cooling trends appear to fluctuate over time, and following a cooling trend, another warm trend occurred during the Transitional period as well. The Transitional period is well represented by radiocarbon dates within the study area. The earlier warm trend was longer and it is possible that the length of time caused occupants of the area to temporarily change their subsistence and habitation strategies. Because all of the dated sites within the study area are limited to an elevation range of 2,000 ft (610 m), we do not know whether this warming trend caused Transitional period populations to move to the higher elevations.

Archaic chronology would benefit from more chronometrically dated sites throughout the Archaic era to further examine the four periods suggested by Reed and Metcalf (1999). Particular attention to sites that date within the Settled period would help to fill in the gaps for the time period.

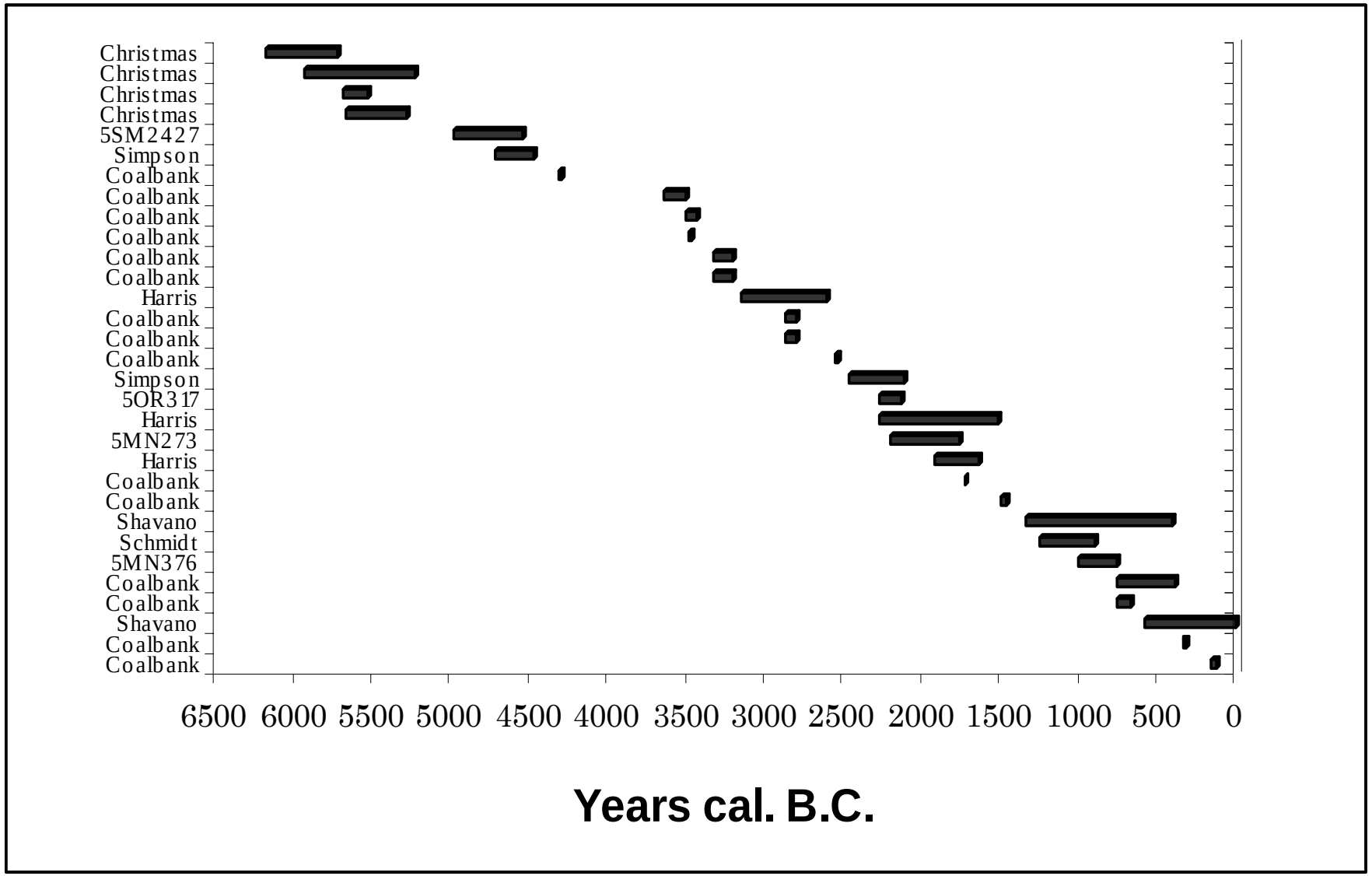


Figure 7. Radiocarbon dates from Archaic sites in the UPAP study area.

Table 22. Radiocarbon Dates for Archaic Sites in the Study Area.

Site	Radiocarbon age B.P.	Cal. Date B.C.	Sample No.	Dated Material	13C/12 C Ratio	Reference
5DT2 Christmas Rockshelter	6660 ± 100	5692-5526	Beta-13055	"Organics"	-25 o/oo	Buckles 1985
5DT2 Christmas Rockshelter	7140 ± 110	6178-5731	Beta-13888	Charcoal	-25 o/oo	Buckles 1985
5DT2 Christmas Rockshelter	6650 ± 200	5941-5222	Beta-13056	Charcoal	-25 o/oo	Buckles 1985
5DT2 Christmas Rockshelter	6600 ± 110	5668-5288	Beta-14424	Charcoal	-25 o/oo	Buckles 1985
5MN40 Shavano Springs	2100 ± 150	575 B.C.- A.D. 230	Isotopes 820	Charcoal	?	Buckles 1985
5MN40 Shavano Springs	2695 ± 180	1340-415	Isotopes 821	Charcoal	?	Buckles 1985
5MN273	3630 ± 80	2200-1760	Beta-130975	Charcoal	-25 o/oo	Eckman et al. 2001
5MN2341 Harris Site	3460 ± 100	1919-1642	Beta-26648	Charcoal	?	Tucker and CAS 1989
5MN2341 Harris Site	3510 ± 270	2270-1520	Beta-25624	Charcoal	?	Tucker and CAS 1989
5MN2341 Harris Site	2730 ± 200	3159-2612	Beta-25625	Charcoal	?	Tucker and CAS 1989
5MN3760	2670 ± 70	1001-760	Beta-49464	Charcoal	?	Conner and Hutchins 1992
5MN3859 Coalbank Canyon	4400 ± 70	3335-3210	Beta-131508	Sediment	?	Kalasz et al. 2001
5MN3859 Coalbank Canyon	4060 ± 60	2865-2806	Beta-131502	Charcoal	?	Kalasz et al. 2001
5MN3859 Coalbank Canyon	4530 ± 60	3495-3467	Beta-131495	Charcoal	?	Kalasz et al. 2001
5MN3859 Coalbank Canyon	4540 ± 70	3503-3428	Beta-131507	Sediment	?	Kalasz et al. 2001
5MN3859 Coalbank Canyon	3290 ± 60	1730-1720	Beta-131501	Sediment	?	Kalasz et al. 2001
5MN3859 Coalbank Canyon	4770 ± 60	3654-3497	Beta-131500	Sediment	?	Kalasz et al. 2001
5MN3859 Coalbank Canyon	4010 ± 80	2864-2807	Beta-131499	Charcoal	?	Kalasz et al. 2001
5MN3859 Coalbank Canyon	4410 ± 70	3337-3208	Beta-131505	Charcoal	?	Kalasz et al. 2001
5MN3859 Coalbank Canyon	2410 ± 70	765-386	Beta-131498	Sediment	?	Kalasz et al. 2001
5MN3859 Coalbank Canyon	2060 ± 60	345-323	Beta-131497	Sediment	?	Kalasz et al. 2001
5MN3859 Coalbank Canyon	5240 ± 80	4320-4294	Beta-131506	Charcoal	?	Kalasz et al. 2001
5MN3859 Coalbank Canyon	1970 ± 70	161-130	Beta-131496	Sediment	?	Kalasz et al. 2001
5MN3859 Coalbank Canyon	2450 ± 60	763-676	Beta-131504	Sediment	?	Kalasz et al. 2001
5MN3859 Coalbank Canyon	3860 ± 70	2554-2539	Beta-131503	Charcoal	?	Kalasz et al. 2001
5MN3859 Coalbank Canyon	3070 ± 70	1500-1467	Beta-131509	Sediment	?	Kalasz et al. 2001
5MN4253 Schmidt Site	2870 ± 70	1260-900	Beta-130989	Charcoal	-25 o/oo	Greubel and Cater 2001
5OR317	4145 ± 90	2280-2130	Beta-2152	Charcoal	?	Muceus and Lawrence 1986
5SM2425 Simpson Wickiup	5760 ± 60	4720-4480	Beta-131104	Charcoal	-25 o/oo	Greubel 2001
5SM2425 Simpson Wickiup	3800 ± 70	2460-2110	Beta-131103	Charcoal	-25 o/oo	Greubel 2001
5SM2427	5910 ± 90	4990-4550	Beta-131028	Sediment	-25 o/oo	Eckman et al. 2001

Settlement Patterns

Settlement pattern models for the Archaic era include generalized hunter-gatherer discussions (Binford 1981; Bettinger 1991), locational models specific to the landscape and vegetation patterns of specific sites (such as Burgess et al. 1980; Hurlbett 1977), and models that focus on subsistence activities within or adjacent to the study area (Metcalf and Black 1991; O'Neil 1993; Stiger 2001b). Some generalized models of Archaic patterns in the Rocky Mountains include the Mountain tradition (Black 1991), which is described as an adaptation to upland terrain and includes ethnicity as a key component, and Stiger's approach for the Gunnison Basin, which uses excavated sites to model settlement. Stiger uses site structure, feature morphology, artifact distribution, floral, and faunal remains to observe changes in settlement patterns.

A general Archaic model for the study area is one based on seasonal mobility. The extreme elevational relief in the Rocky Mountains horizontally compresses the vegetation communities leading to an up-down model of seasonality (Benedict 1992). The Uncompahgre Plateau has similarly compressed vegetation communities, making this model applicable to the study area. Grady (1980) and O'Neil (1993) have both used an up-down model for the western plateau area of Colorado and the Grand Junction Resource area, respectively. Seasonal changes of floral and faunal resources at different elevations direct a seasonal mobility. In the spring, snowmelt and warming temperatures in the lower elevations provide greening foliage, which progresses to higher elevations later in the season. During the heat of the summer months, the higher elevations provide sustenance and relief both for humans and the animal resources they rely on. These elevations are cooler and wetter, which is conducive to abundant plant growth. Winters were spent between the high and low elevations in the pinyon-juniper zone, which provided access to fuel, shelter, and wild game (Reed et al. 2001).

A map of the UPAP study area shows the Archaic sites and elevation zones (Figure 9). By comparing the percentage of sites in each elevation zone with the percentage of the study area that falls within each elevation zone, we can see that the elevation zones of 6,000-7,000 ft (1,829-2,134 m) and 7,000-8,000 ft (2,134-2,438 m) are heavily occupied during the Archaic era (Table 23). These elevation zones make up the greatest percentages of the study area as a whole, but the numbers of sites within their boundaries exceed that which would be expected. The relative paucity of Archaic sites in the lowest elevations may reflect the prevalence of privately owned lands in the major valleys, where fewer inventories have occurred, and reduced site visibility resultant from agricultural and other developments. Figure 8 gives a visual model of these percentages.

Table 23. Elevations of All Archaic Sites.

Elevation Zone (ft)	Elevation Zone (m)	Elevation Zone Percentage of Study Area	Percentage of Archaic Sites
Less than 5,000	Less than 1,524	6	1
5,001 – 6,000	1,524 – 1,829	23	14
6,001 – 7,000	1,829 – 2,134	29	38
7,001 – 8,000	2,134 – 2,438	25	32
8,001 – 9,000	2,438 – 2,743	16	13
Above 9,000	Above 2,743	1	3

All of the excavated Archaic components in the study area fall between 5,000 ft and 7,200 ft (1,524-2,195 m) with the majority of at around 6,000 ft (1,829 m). This distribution is not completely consistent with the distribution of all Archaic sites identified from the survey data. It is possible that sites within this range of elevations reflect longer occupations and, thus, are more apt to be chosen for excavation. All but two of the sites are located in or very near the pinyon-juniper zone, suggesting that these sites may have been used for winter habitation. None of the excavated Archaic

sites extend very far into the upper elevations of the Uncompahgre Plateau, although the larger group of sites in the survey data seems to be consistent with the percentages of elevations of the study area.

In an analysis of prehistoric use of high altitudes (i.e., altitudes over 7,500 ft [2,286 m] elevation), Reed et al. (2001) noted variability through time. Their data suggested that the high altitude zones on the Uncompahgre Plateau and in the San Juan Mountains was occupied by Paleoindian but not Archaic groups. To ascertain whether the absence of high altitude Archaic sites was simply a reflection of sampling error, dated sites from a broader portion of western Colorado were incorporated into the study. This effort resulted in the addition of a number of dated sites, most of which were in the Gunnison Basin. The Gunnison Basin sites indicated a much different pattern, in which the basin was essentially continually occupied throughout the Archaic era, though relatively few dated sites are known at approximately cal 3800 B.C. According to Stiger (2001), use of the Gunnison basin continued after cal 1200 B.C., though with less of a residential focus.

Although the Gunnison Basin data may indicate that the dearth of high-altitude Archaic sites on the Uncompahgre Plateau and in the mountains to the south may reflect sampling error, it is also possible that Archaic occupation of the Gunnison Basin was much different than that of the Uncompahgre Plateau. In this scenario, Colorado's high elevations west of the Gunnison Basin were scarcely used during the Archaic, though the surrounding lowlands were occupied. The uplands of the Uncompahgre Plateau were occupied once again after approximately cal 1200 B.C., when intensive occupation of the Gunnison Basin waned. The addition of data from other well-dated Archaic sites on the Uncompahgre Plateau is needed to test this model.

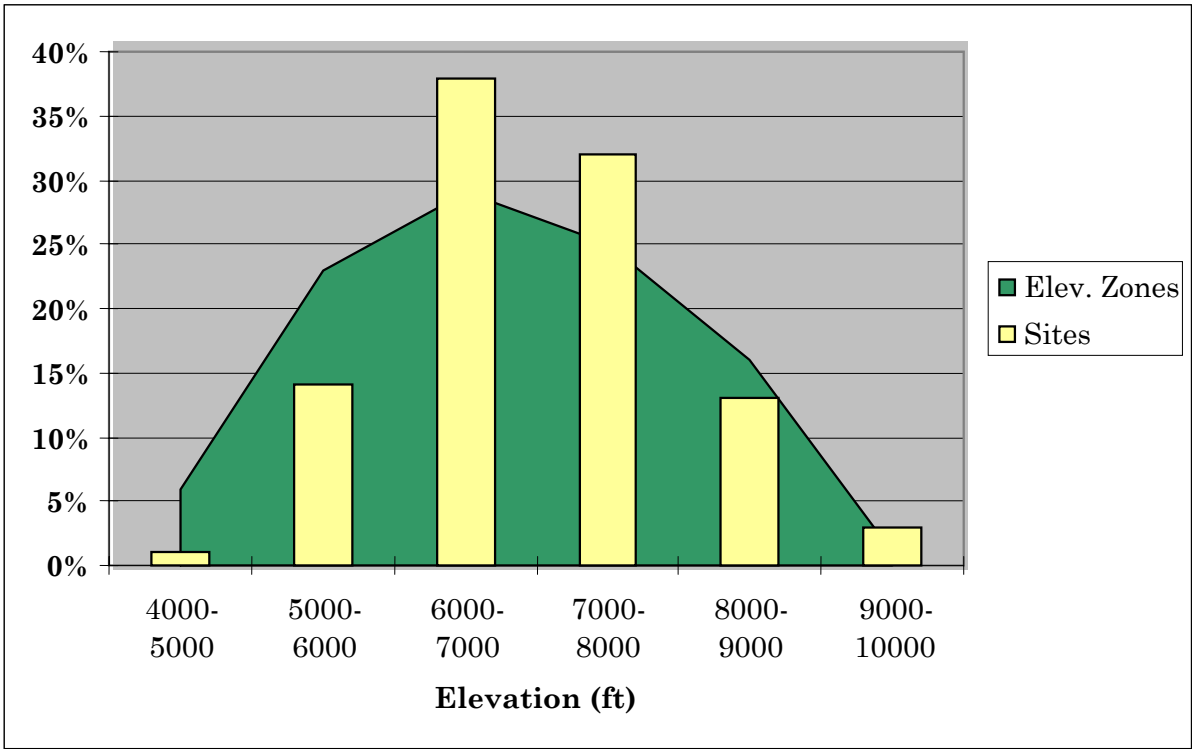


Figure 8. Elevations of the UPAP study area and Archaic sites.

Figure 9. Distribution of Archaic sites in the UPAP study area by elevation zone.

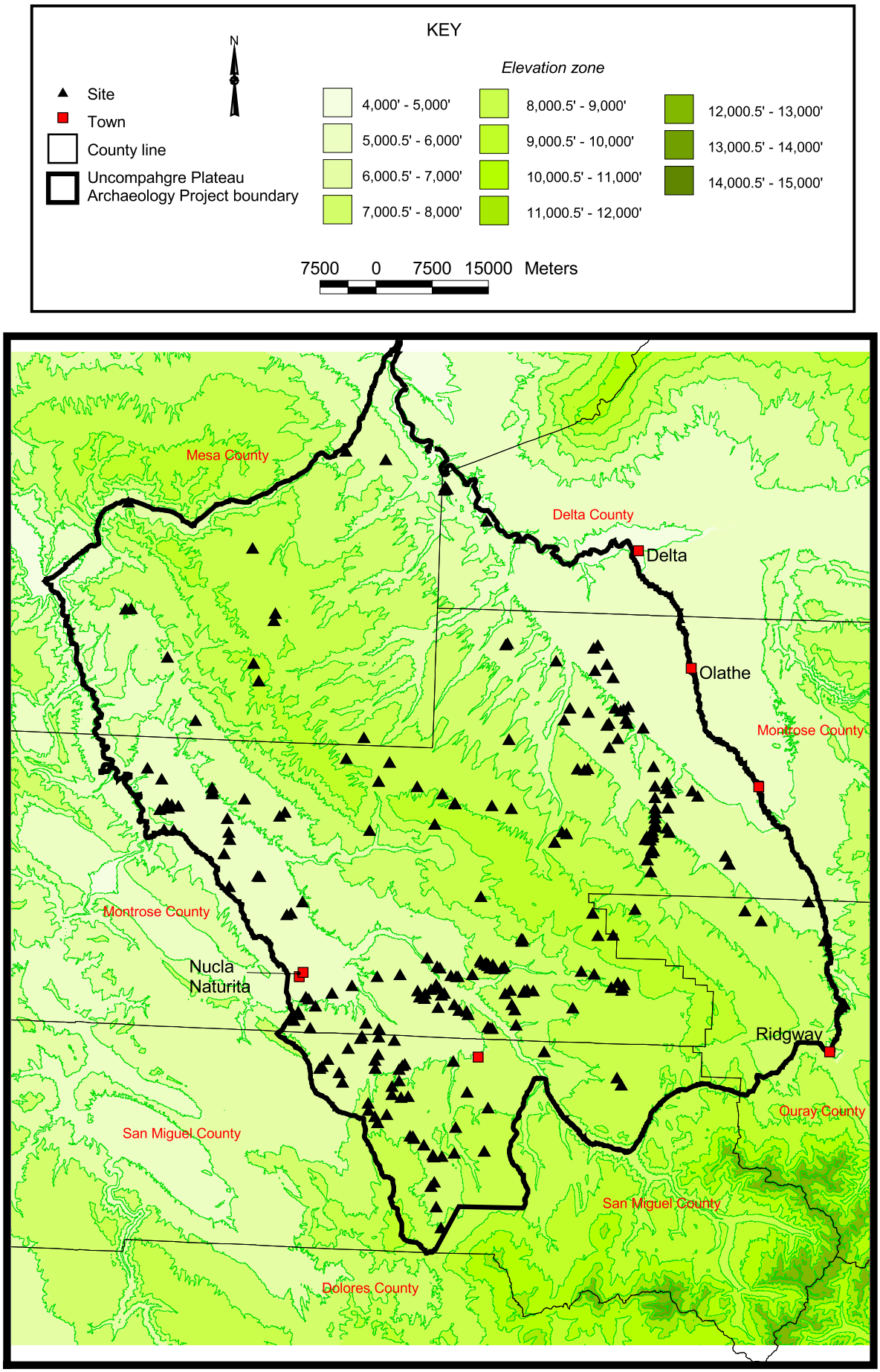


Figure 9. Distribution of Archaic sites in the UPAP study area by elevation zone.

Mobility

A key component to modeling settlement patterns is discerning the length of time that sites were occupied. A great deal of site variability can be explained by length of site occupation. Susan Kent (1992) has developed a useful approach for comparing relative group mobility. Kent's model, based firmly in ethnographic research, assumes that much of site variability is related to the length of time that a group plans to spend at a site. She has found that groups anticipating a lengthy stay at a site will invest more labor in the construction of habitation structures, will bring more diverse artifacts and resources to a site, and be more likely to delineate discrete and dedicated activity areas than if occupying a site planned for short-term use. In her analysis of Pueblo II habitation sites, Kent (1992) found that sites planned for long occupation were characterized by relatively large site size, formal middens, formal storage features, low ratios of formal flaked tools as opposed to debitage, relatively diverse ceramic assemblages, ornaments, and non-local ceramic types. Through analysis of the distribution of these variables at five Pueblo II habitation sites, Kent was able to distinguish sites planned for long-term habitation from those planned for short-term habitation; i.e., between seasonal habitations sites and primary residences. Furthermore, analysis of site variability permitted her to determine actual length of occupation. Kent found that some sites with formal site layout and considerable investment of construction labor were actually inhabited for a short period, and that some sites planned for short-term occupation were actually inhabited for a long period. Insight into length of actual occupation was primarily based on site size, the relative abundance of ceramic artifacts, and the ratio of chipped stone tools to the total chipped stone artifact assemblage.

Although Kent's (1992) model did not include nonstructural sites, it can be adapted to do so, because the middle range theory on which her model is based is not specific to relatively sedentary horticulturists. The variables to be used by this project to gain insight into anticipated and actual length of site occupation are described below.

Structure Labor: As Kent (1992) has shown, the anticipated length of site occupation is reflected by the amount of labor invested in habitation structure construction. Sedentary farmers, for example, built far more complex habitation structures than did highly mobile hunter/gatherers. Habitation structures are classified into three groups to indicate relative level of labor investment. Pit structures and surface rooms made of masonry or jacal are classified as requiring "high" labor investment. Basin houses, which constitute the large majority of Archaic-era houses, are classified into a "moderate" or "medium" group. Wickiups, small brush structures with unexcavated floors, are considered to reflect a "low" investment of construction labor.

Pit Feature Labor: Although not examined by Kent (1992), it seems reasonable that the amount of labor invested in the construction of thermal features would reflect anticipated length of site occupation. Thermal feature complexity ranges from shallow hearths, created by simply scooping away earth to create a basin, to slab- or rock-lined pits, some of which may exceed 30 cm in depth. It is plausible that a hearth created for a one-night encampment would be relatively simple, whereas a hearth designed for repeated use would be relatively complex. For this analysis, pit features that are rock- or slab-lined, are coped, or that exceed 30 cm in depth will be classified as representing "high" investment of labor. Smaller, unlined firepits will be classified as representing "low" labor investment.

Storage Feature Labor: Kent (1992) found that the presence of formal storage facilities was indicative of anticipated long-term site occupation. It seems her observation can be taken a step further, to differentiate storage features created with relatively little labor from those created with great effort. No storage features are expected at sites anticipated for short-term use. Sites with storage features requiring only a modest investment of labor, such as simple pits and shallow slab-lined features, were possibly occupied by peoples anticipating a "moderate" length of site occupation. Storage facilities classified as reflecting "high" labor investment include storage rooms and bell-shaped pits.

Mean Size of Fire-Cracked Rock: In a recent experiment on stone boiling, Jensen et al. (1999) found that rocks used in stone boiling break down through repeated use, ultimately resulting in pieces too small to efficiently boil water. The relative size of fire-cracked rock, therefore, provides some indication of the intensity of site use.

Ceramic Labor: Insight into group mobility can also be gained through analysis of the relative amount of labor invested in ceramic production. All ceramic-manufacturing groups, regardless of mobility, must weigh labor and material costs against desired vessel life expectancy and make compromises that maximize energetic efficiency. In a recent study of ceramics in the Great Basin, Simms and Bright (1997) have convincingly argued that more sedentary groups tend to invest more effort in ceramic production than more mobile groups, partly because vessel use-life can be expected to be longer. Consequently, more care is taken in the selection of clay and temper materials, size grading of temper material, and control of firing atmosphere, because these technological and methodological factors affect vessel strength. The amount of labor invested in ceramic production will be divided into three groups. Brown ware ceramics are classified as requiring a "low" amount of construction labor; gray ware ceramics are classified into a "moderate" category; and white wares and red wares are classified as requiring a "high" degree of labor investment.

Exotic Ceramics and Ornaments: Kent (1992) found that sites anticipated for long-term habitation tended to have more resources brought to them. It is also likely that artifacts such as ceramics obtained through long-distance trade or that were produced with great effort would be more highly curated than other artifacts, and so would be less likely to enter archaeological deposits at any particular point in time. The longer a site is occupied, the more likely it is that highly curated artifacts will become broken or lost and enter the archaeological deposits.

Debitage Density: In general, the longer a group occupies a site, the more debris they leave behind. This value can be estimated by dividing the number of flakes attributed to a component by the area or volume excavated within that component.

Reduction Strategies: Work by Kelly (1988) and others have shown a relationship between group mobility and lithic reduction strategies. These studies indicate that highly mobile groups tend to exhibit reduction strategies oriented to biface production, as bifaces are suitable for various cutting and scraping duties and also serve as relatively lightweight cores, making them energetically efficient for frequent transportation (see Parry and Kelly 1987; Torres 2000). On the other hand, relatively sedentary groups, such as the Anasazi, evidence a core reduction strategy more oriented toward production of flakes suitable for various uses (Sullivan and Rozen 1985; Torres 2000). For the current study, lithic reduction strategies will be classified as representing "biface production," "flake production," or "both." It is acknowledged that determination of a component's dominant reduction strategy is a rather subjective assessment, as multiple lithic reduction strategies are represented to some degree at most sites.

Percentage of Expedient Tools: Because of lithic technology models that equate high mobility with extensive biface use (e.g., Parry and Kelly 1987), it is expected that expedient tool use will be mostly represented among relatively sedentary groups. For this study, expedient tools will include utilized flakes and retouched flakes. Relative frequencies will be determined by dividing the number of expedient tools by the number of tools in a component's assemblage.

Number of Flaked Stone Tool Classes: This is a count of the different types of flaked stone tool classes present. The formal tool classes include projectile points, bifaces, end scrapers (formal), choppers, drills, and hammerstones. Expedient tool classes include utilized flakes and retouched flakes. It is expected that a higher variety of tool classes would indicate a longer occupation.

Tool Diversity Index: To obtain a general estimation of artifact richness and diversity within a component, a tool diversity index will be calculated by multiplying the number of flaked stone tool classes (e.g., projectile points, bifaces, utilized flakes) by the total number of flaked stone tools. It is expected that high tool diversity will be associated with sites occupied for a long period, because length of actual occupation is related to the diversification of activities. The index is relative, and is assessed in the context of a group of sites.

Milling Technology Labor: Hard et al. (1996) have successfully correlated increases in grinding areas on manos to increased reliance on cultivated foods, as indicated by stable carbon isotope analysis of skeletal material. Because the degree of dependence on cultivated foods is generally correlated with degree of sedentism, mano type will be considered a likely indicator of general group mobility. For this study, two-hand manos will be considered an indication of "low" mobility, and one-hand manos will be considered an indication of "high" group mobility. Heavy use wear and resharpening (pecking) of ground stone tools are also indications of a higher degree of sedentism (Adams 2002). These factors will be taken into consideration when determining mobility.

Bone Grease Production: Production of bone grease is a rather labor-intensive activity. After the bones have been stripped of their meat, they must be broken into small fragments. The bone fragments must then be boiled to release the fats contained in the bones; this may involve stone boiling, which, requires considerable labor by itself (see Jensen et al. 1999). Because of the labor and resources necessary for bone grease production, it is likely that the activity occurred at residential bases and field camps, rather than at resource procurement locations. Components with large quantities of highly fragmented large mammal bone will be considered candidates for bone grease production.

Faunal and Floral Diversity: As with other material items, it stands to reason that the longer a site is occupied, the greater the diversity of constituent items. An indication of faunal or floral diversity will be measured by counting the species represented within the assemblages. Floral analysis will only consider macrobotanical specimens.

Fuel Wood Diversity: The diversity of wood species in hearths may also be an indication of intensity of site use. In compiling data on TransColorado dated hearth fuel woods, it became apparent that the greatest species diversity was represented among the Pueblo period hamlets or villages, even though it seemed likely that those hearths would have been subject to more cleaning than features at short-term sites (Reed et al. 2001). Component function has traditionally been determined by excavators without regard for fuel wood diversity. Correlations between the diversity of wood species and site function might have meaning. As a test of this hypothesis, the number of fuel wood species represented in radiometrically dated hearths where component function had been suggested was tabulated. Data were divided into two groups by general component function, one group consisting of residential bases and hamlets and the other consisting of field camps, resource processing locations, and field houses. The sample included 32 hearths in the residential category and 50 hearths in the limited activity group. The mean number of fuel wood species was calculated for each group. The sites in the residential group had a mean of 3.4 species per hearth, whereas the limited activity group had a mean of 1.6 species per hearth — less than half of that of the residential group. The discrepancy in means is statistically significant, suggesting that more intensively occupied sites indeed evidence more fuel wood diversity than less intensively occupied sites, and that the variable is useful for assessing length of occupation. For this analysis of diachronic trends in group mobility, hearths containing identifiable wood species will be considered. Where hearths indicate two or less species, that component will be described as having low fuel wood diversity. Components with hearths yielding three or more species will be described as having high fuel wood diversity.

Site Cleaning: Various studies have shown that site cleaning is related to anticipated length of site occupation (e.g., Kent 1992; Stevenson 1991). Among the sites in Kent's (1992) study, sites anticipated for long-term use tended to have formal middens, whereas sites planned for short-term use lacked such. The level of site cleaning also varies at nonstructural campsites; a site occupied for a single day may lack any evidence of site cleaning, whereas a site occupied for several days will usually evince removal of large pieces of debris away from primary activity areas. The degree of site cleaning will be assessed among the project components.

Shelter Quality: Shelter quality is an additional variable that we included for use in the UPAP study area. Rockshelters provide shelter from heat, cold and inclement weather. Shelter quality also reflects the presence of substantial architecture. For this reason, sites in these locations might have been more intensively utilized and occupation may have been longer. This variable is coded as present or absent.

In Kent's (1992) model, four basic mobility scenarios are possible. Sites can be anticipated for either long-term or short-term occupation, and the sites within those two groups can actually be occupied for either long or short periods. Sites anticipated for long-term occupation will evidence formalized site layout, substantial habitation structures, and elaborate pit features. Sites anticipated for long-term occupation that yield large quantities and diversities of artifacts and ecofacts represent actual long-term occupation. Conversely, sites anticipated for short-term occupation are characterized by low investment of labor for feature and structure construction and little patterning in site layout. Among these sites, those that are actually inhabited for long periods will be characterized by high diversity and large quantities of artifacts and ecofacts, and sites actually occupied for short periods contain few artifacts and low artifact diversity. The four basic scenarios and the expectations for the attributes listed above are presented in Table 24.

By examining a set of variables for each investigated site and assigning it a mobility category, insight can be gained into how residential mobility changed through time and across space. Some groups may have occupied sites in highly productive environments for long periods, and other groups – or groups in other periods within the Archaic –may have moved more frequently.

Table 24. Expected Site Attributes by Mobility Category.

Variable	Anticipated Long Actual Long	Anticipated Long Actual Short	Anticipated Short Actual Long	Anticipated Short Actual Short
Structure Labor	High	High	Low	Low
Pit Feature Labor	High	High	Low	Low
Storage Feature Labor	High	High	Low	Low
Mean Size FCR	Small	Large	Small	Large
Ceramic Labor	High	High	Low	Low
Exotic Ceramics	Present	Absent	Possible	Absent
Debitage Density	High	Low	High	Low
Reduction Strategy	Flake Tools	Flake Tools	Bifacial Tools	Bifacial Tools
Expedient Tools	Dominant	Dominant	Common	Uncommon
No. of FST Classes	High	Low	High	Low
Tool Diversity Index	High	Low	High	Low
Ornaments	Present	Absent	Present	Absent
Milling Technology Labor	High	High	Low	Low
Bone Grease Production	Present	Possible	Possible	Absent
Fauna Diversity	High	Low	High	Low
Floral Food Diversity	High	Low	High	Low
Fuel wood Diversity	High	Low	High	Low
Site Cleaning	High	Low	Moderate	Low
Reference	**Category 1**	**Category 2**	**Category 3**	**Category 4**

The excavated components for the study area were evaluated against Kent's mobility variables. Several of the site components included in our excavated sites list did not provide information on debitage, expedient tools, floral, and faunal remains. In five cases, a determination of mobility could not be made. The remaining sites are presented in Table 25.

Table 25. Mobility of Excavated Archaic Sites.

	Christmas Rockshelter Pioneer	Simpson Wickiup Site Comp 1 Settled	Coalbank Canyon Site Settled	Simpson Wickiup Site Comp 2 Transitional	5OR317 Transitional	Shavano Springs Terminal
Structure Labor						
Pit Feat. Labor	high	high	high	high	low	low
Storage Feat. Labor	none					
Mean Size FCR		.25 kg	.33 kg			
Ceramic Labor						
Exotic Ceramics						
Debitage Density	412		59.7	4	10.6	68.6
Reduction Strategy	both		both	both	both	both
Expedient Tools	67%		62%	45%	34%	40%
No. Flaked Stone Tools	high (8)		low (4)	low (4)	low (4)	high (7)
Tool Diversity Index	4,424		654	24	140	1162
Ornaments						
Milling Technology Labor	high	low	medium		low	low
Bone Grease Production						
Fauna Diversity		low	low		low	
Floral Food Diversity		low	low		low	
Fuel Wood Diversity		low	high			
Site Cleaning						
Shelter Quality	good					
Mobility Group	**1 long/long**	**4 short/short**	**3 short/long**	**4 short/short**	**4 short/short**	**4 short/short**

The majority of these sites were designated as short-term anticipated and short-term actual occupation. One Archaic component received the designate of Category 1 (anticipated long-term/ actual long-term occupation) and one was designated as Category 3 (anticipated short-term and actual long-term occupation). The Christmas Rockshelter, designated as Category 1, had the benefit of a natural shelter, high pit feature labor, a high number of flaked stone classes, and a very high tool diversity index. There was also a large percentage of expedient tools, high milling technology labor and an extremely high debitage density. The Settled phase component of the Coalbank Canyon site was assigned a designation of Category 3. The high percentage of expedient tools, a higher fuel wood diversity, and the milling technology labor were all factors in assigning this site to a Category 3. Stiger (2001b) suggests that the great number of nonresidential sites in the Archaic may reflect a greater use of specialized function sites. This seems to be the case for the dated sites in the UPAP study area, as none of these sites included habitation structures. Habitation structures are present in the Gunnison Basin after cal 7000 B.C. and are thought to be winter residences there. As we have mentioned before, the Gunnison Basin seems to have had a different settlement pattern than is seen on the Uncompahgre Plateau. Aside from the Christmas Rockshelter, the sites in the excavated database are short-term camps, indicating a very mobile pattern for the Archaic.

Another facet of mobility variation pertains to length of occupation in various vegetation zones. It is hypothesized that length of anticipated and actual occupation will be closely linked to the carrying capacity of a vegetation zone. Those vegetation zones with the highest productivity are expected to evidence the lengthiest site occupations. Dames and Moore (1994:33-7) present data regarding the productivity of various vegetation zones in the region expressed as biomass grams per square meter per year (Table 26). If the hypothesis is correct, the data should suggest that sites near marsh settings contain evidence of the longest actual and anticipated occupations. The Upper Woodland and Forest zones might also be expected to evidence lengthy occupations, though in those instances, snow cover might render those areas inaccessible for a considerable portion of the year, thereby reducing the likelihood lengthy winter occupations. The other zones, however, are below the elevation levels where snow cover is deep enough to compel seasonal out-migration by large game and humans. The scrub communities are particularly unproductive; it is likely that such areas were used for tuber or herb gathering and limited hunting, but that primary residential sites were located in other zones, where plants and animals were more abundant, especially in the Marsh, Lower Woodland, and Woodland vegetation zones. Some degree of temporal variation in the expected patterns may be detected, reflecting climatic fluctuations that may have enhanced or diminished the extent of the vegetation zones.

Table 26. Productivity by Vegetation Zone.

Vegetation Zone	Approx. Elevation (ft)	Present Productivity (g)
Marsh	3,280	3,000
Salt Scrub	3,937	30
Mixed Scrub	4,593	60
Sagebrush Scrub	5,249	120
Scrub/Woodland	5,905	200
Lower Woodland	6,561	600
Woodland	7,218	700
Upper Woodland	7,874	900
Forest	8,530	1,200

At the highest elevations of the Uncompahgre Plateau, a temperate evergreen forest is comprised of spruce, fir, lodgepole pine, aspens and grassland parks. Just below that is a woodland zone of ponderosa pine, Douglas fir, blue spruce, and white fir. Below this is the lower and scrub woodland areas of pinyon and juniper. The lowest area, the scrub zone, is made up of greasewood and saltbush. The marsh zone is limited to a few uplands springs and ponds. The majority of sites in the study area occur in the woodland zones. This fits with the higher productivity levels of these zones. As mentioned above, the snow cover at the highest zone would diminish its productivity for much of the year. This is reflected in the low number of sites above 8,000 ft (2,438 m) (see Table 23).

Subsistence

With the completion of the TransColorado pipeline project, the database comprised of direct subsistence information was finally sufficiently large to develop a subsistence model specifically for the Archaic era of western Colorado. In brief, the model states that local Archaic groups most heavily relied on a relatively narrow range of plant and animal resources, at least compared to the Formative adaptations that followed. Whether the suite of the primary plant and animal resources was more narrowly focused than that of the Paleoindian era could not be determined, because too few data were available from local Paleoindian components.

The TransColorado data indicated hunting focused heavily on deer. Deer bones comprised 66 percent of the identifiable animal bone from the set of Archaic components, which is three times

higher than that of Formative-era hunter/gatherer groups and 19 percent higher than that of Ute components. Other large artiodactyls, such as elk, bighorn, pronghorn, and bison, comprised 5 percent or less of all faunal samples, so were infrequently taken by all groups. Small animals were also exploited, though problems in differentiating rodent bones resultant from food use from those resultant from natural processes confound interpretations. In general, frequencies of rodent bones are similar between Archaic, Formative, and Ute assemblages (Reed et al. 2001). Rabbit and hare (leporid) bones, however, appear to vary in relative frequencies in meaningful ways. Leporid bones comprised 10 percent of the identified bone from Archaic contexts, 48 percent of the identified bone in Formative-era hunting and gathering group contexts, and 30 percent of the bone from Ute contexts. This suggests that small animals were less intensively exploited by Archaic hunters, who focused instead on higher-ranked animals, such as deer.

TransColorado data also indicated that Archaic groups processed large mammal bone to extract fats and other nutrients. This interpretation was based on the percentage of unidentifiable large mammal bone fragments in the Archaic faunal samples. Bone processing involves crushing bones for subsequent boiling; the bone reduction renders much of it unidentifiable, except as large mammal. The percentages of unidentifiable large mammal bone from Archaic contexts were, however, substantially lower than those of local Formative-era hunters and gatherers, and much lower than those of Ute components (Reed et al. 2001).

The floral data from local Archaic sites suggest reliance on goosefoot/pigweed (Cheno-Ams) plants, which is the case with macrobotanical samples from all other archaeological units. The data were inadequate for determining whether Archaic groups relied most heavily on the highest-ranking plant species. Evident, however, is a trend for Archaic exploitation of a relatively narrow range of plant food species. Archaic macrobotanical samples yielded only eight possible plant species, compared to 20 from samples representing local Formative hunter/gatherers, and six species from Ute components. These data clearly indicate that Archaic gathering strategies were substantially different from those of the Formative-era groups.

The comparatively low intensity of reliance on gathered plant foods during the Archaic is also reflected by frequencies of ground stone artifacts. Although ground stone can be used for other purposes than grinding plant foods, it is reasonable to assume a rough correlation between ground stone frequencies and the relative importance of plant processing. Indices reflecting ground stone frequencies were derived from TransColorado project assemblages by dividing the number of manos or mano fragments by the number of flaked stone tools. The larger the resulting value, the higher the ratio of manos to flaked stone tools. When segregated by major archaeological unit, the indices indicated lowest values for the Ute assemblages, moderate values for the Archaic assemblages, and high values for the Formative assemblages (Reed et al. 2001).

In summary, local Archaic subsistence practices were based on hunting and gathering. Archaic hunters were able to focus on relatively highly ranked food resources, such as deer, though smaller animals, such as rabbits and hares, also comprised a substantial proportion of their diets. Peoples representing subsequent archaeological units were less able to focus on deer and incorporated more leporids into their diets. All groups processed animal bone, but such was comparatively less important to Archaic peoples. Gathered plant foods were also important to local Archaic groups, who evidently ate such foods as juniper fruits, pinyon nuts, mint, tansy mustard, cactus, cattail, and grass seeds (Reed et al. 2001). The diversity of plant species collected for food, however, was roughly comparable to that of the Ute, and substantially lower than that characterizing the Formative era. Ground stone frequencies suggest that Archaic groups required fewer grinding implements than the peoples that immediately followed them.

The Archaic subsistence model derived from the TransColorado project data cannot be effectively evaluated in terms of direct subsistence data from the UPAP study area because of the

scarcity of data. Many of the sites were excavated in the 1960s, when macrobotanical and palynological sampling were not routinely done. Animal bone was collected on the Ute Prehistory Project, but was lost prior to analysis (Buckles 1971). Excavated sites in the project area have yielded charred goosefoot, juniper seeds, and prickly pear, as well as Cheno-Am pollen. Discussions of fauna may refer to large artiodactyls. The dearth of direct subsistence data from the study area points to an important line of future research. Additional data are sorely needed to test the model presented above, and to generate new, more refined models. It is likely, for example, that subsistence practices changed through time within the six millennia comprising the Archaic era. Discernment of such fine-grained trends is currently impossible, however.

Technology

Architecture

No Archaic habitation structures have been excavated in the UPAP study area. Regional evidence suggests, however, that Archaic peoples occupied basin houses, such as those excavated at the Indian Creek site just east of the project area (Horn et al. 1987). Basin houses are characterized by the following attributes (Reed et al. 2001:41-69):

- Irregular perimeters
- An oval or elliptical shape
- A shallowly basin-shaped floor
- Low and often sloping walls
- Undulating floors
- Internal pit features, often around the periphery
- Nearby extramural features

More formalized pit structures have also been found along the Colorado River north of Eagle, Colorado. This site – Yarmony House — yielded an early Archaic habitation architecture that is, so far, unique in the archaeological record (Metcalf and Black 1991). Although it is possible that formal pit structures will be found in the UPAP study area, it is more likely that basin houses or the remains of ephemeral brush structures will be found in Archaic contexts.

Thermal Features

A regional pattern of thermal features has been defined for the Upper Gunnison Basin (Stiger 2001b:101-111). Types of thermal features differ in depth and diameter as well as the stone associated with them. The types are as follows:

Big-Deep Fire-Cracked Rock (FCR) Features: these are deep enough to hold several rocks stacked within them and were probably used for roasting in quantity.

Small-Shallow Fire-Cracked Rock Features: these usually contain a single layer of rock; they tend to be smaller in diameter than the deep features.

FCR-Outside Features: small firepits with the fire-cracked rock emptied just outside the feature. These are fairly restricted in distribution and were probably associated with special resource processing.

Rock-Lined Firepits: These are firepits lined with rocks. Stiger notes a possible trend of smaller rocks used earlier and larger slabs used later in time. These are associated with intensive occupations.

Unlined Firepits: These are simple pits that have ash or charcoal in them. This type was found in all time periods in the Upper Gunnison Basin.

Boiling Pits: A feature that appears to have been used for boiling stones. These are commonly found in pairs.

Many of the Archaic excavated components within our study area included fire features with a high degree of labor. Slab-lined thermal features were common at all of the earlier sites regardless of whether they were short- or long-term occupations. The one Terminal phase occupation, at the Shavano Springs site, had only unlined fire features. This is consistent with Stiger's date ranges for rock-lined fire pits, which fall between approximately cal 6380 and 1130 B.C. There did not appear to be any FCR features or boiling pits in our sample of excavated sites.

Lithic Reduction Strategies

Lithic reduction strategies are more closely tied to mobility patterns than they are to cultural or archaeological groups. Current models suggest that highly mobile groups needed reliable, versatile, and easily transportable stone artifacts, and so were more likely to manufacture and use bifaces than more sedentary groups (e.g., Parry and Kelly 1987). Bifaces are suitable for various cutting or scraping tasks, and are also suitable for use as cores to produce flakes for other uses. Relatively sedentary groups are more likely to employ a lithic reduction strategy based on core reduction. Cores were reduced to produce flakes suitable for various uses, with much less investment of labor. The core reduction strategy requires greater quantities of lithic material, and so is associated with higher transportation costs, but this mattered little if suitable materials were relatively close to the settlements. The two technological trajectories can be differentiated through analysis of various types of flake attributes (Ahler 1986).

In a review of lithic reduction technologies through time in western Colorado, Kim Redman of the TransColorado pipeline project team confirmed the general patterns summarized above (Reed et al. 2001). She found that the least mobile groups in the region – the Anasazi – had debitage collections indicative of core reduction strategies, and that the more mobile hunter/gatherer groups were more likely to have emphasizing biface reduction. The differences between Archaic, Formative hunter/gatherer, and Ute collections were not as patterned as anticipated, however, as mobility was thought to vary between the groups. All these groups had components identified as biface reduction or both biface reduction and core reduction, and lithic reduction patterns were not diagnostic of archaeological unit.

Of the excavated Archaic components within the study area, the majority included both biface and core reduction technology. The presence of expedient tools and diverse tool types at some sites designated short-term occupations indicate that they functioned as more than temporary camps.

Additional research is needed to better characterize the lithic reduction strategies of the region's archaeological units. The quality of interpretations will also increase as more variables are considered. Such research might include determining lithic reduction strategies for key material types found at a site and assessment of the distance between a site and the lithic sources represented at a site.

Ground Stone

Following a similar pattern found within the Archaic era sites of the TransColorado Project (Reed et al. 2001), slab metates were by far the most prevalent style of metate. Basin metates were also present, but in far fewer quantities. The wide variety of foods that can be processed on a slab metate makes it the best choice if only a few metates are needed at a site. The basin metates are limited in what can be processed on them, as they are restricted to a smaller working area and one possible grinding stroke. Experimental studies (Adams 1993) indicate that dried seeds are more easily ground with the basin metate, as they are prone to falling off a flat metate. At the same time,

the circular basin metate grinding is more tiring than the reciprocal grinding of a flat metate and mano. The flat metate and mano grind greater amounts of food with more speed and efficiency.

Ground stone was present at all but one of the excavated components in the study area indicating that some level of vegetal food processing was occurring even at the short-term sites. At the two sites that were designated short-term anticipated/long-term actual occupations, a variety of ground stone tool types was present, and there was evidence of tool maintenance and resharpening.

At the Christmas Rockshelter, the large sample of manos suggests a greater level of food processing occurred here. The greater percentage of resharpened or pecked surfaces indicates a greater intensity of use and, possibly, a greater reliance of seeds and grasses requiring rougher surfaces for processing.

Both slab and basin metates are present during the Settled component at the Coalbank Canyon site. Slab and basin metates represent different processing strategies for food resources. Each requires a different stroke of the mano; the slab metate and mano generally utilize a reciprocal stroke while the basin metate requires a circular stroke. As mentioned above, the presence of both of these tool types indicates a variety of grinding strategies and suggests a greater importance on food processing.

More detailed analysis of ground stone would further our understanding of subsistence in the Archaic era. Microscopic use-wear analysis of manos and metates may reveal greater insight into what was actually being processed at these camps. This would be especially helpful in cases where the macrobotanical evidence is lacking.

Paleoenvironment

As discussed in the Chronology and Settlement Patterns sections, abrupt shifts in the paleoclimate of the study area during the Archaic era may have compelling implications for changes that occurred during the era. These warming and cooling episodes may be strongly tied to the occupation and subsistence shifts from the Paleoindian to the Archaic and again between the Archaic and Formative eras (Reed and Metcalf 1999). The idea put forth by Benedict (1979) of the region as a refuge for populations from lower elevations during the Altithermal is probably not the case. The extreme elevations squeeze resources into narrow bands, restricting the carrying capacity of the region. Population changes probably occur within the area as residential patterns shift from high to low elevations, and not as a result of extra-regional migration (Reed and Metcalf 1999). Further exploration of sites in the lower and higher elevations will expand our understanding of settlement patterns during this variable era.

Particularly Important Sites

Aside from a general need for more dated Archaic sites within the UPAP study area, several gaps in the data are particularly problematic. The radiocarbon record is sparse between 4500 and 3500 B.C. Climatic shifts at this time suggest that sites that date within this period may very well be located in the higher or lower elevations. Particularly important Archaic sites on the Plateau include sites that date within this date range so that we can broaden our understanding of Archaic activities during this 1,000 year period. This brings us to another gap in the archaeological record. All of the excavated and dated sites in the project area fall roughly between 5,000 and 7,000 ft (1,524-2,134 m) in elevation. The broader survey data includes a good percentage of sites that are within the 7,000 and 8,000 ft (2,134-2,438 m) zone, but none of these have been excavated or chronometrically dated. Our database of excavated sites is, for the most part, made up of temporary, specialized, processing camps. The one exception, Christmas Rockshelter (5DT2), differed both because of its superior shelter quality and its lower elevation of 5,280 ft (1,609 m). Sites above and below the pinyon-juniper woodland zone are crucial if we are to understand settlement patterns

during the Archaic era. A third area of importance is the recovery of macrobotanical remains at Archaic sites. We have very minimal macrobotanical data for Archaic sites on the Plateau. This is due, in part, to the poor preservation at many open Archaic sites. Of particular importance are deeply buried sites and sheltered sites which might yield better preserved macrobotanical remains.

The Archaic era is characterized by seasonal mobility; to fully understand the settlement patterns on the Uncompahgre Plateau it is necessary to locate and record information about all of the site types within the seasonal round. Additionally, many of the excavated sites in the study area were excavated years ago and do not meet current standards for data collection and analysis. Better information on floral and faunal remains, as well as debitage and ground stone analysis, would be invaluable to the understanding of the Archaic era on the Uncompahgre Plateau. Because of the dearth of excavated Archaic sites on the Plateau, relative to the large time span covered by this era, any Archaic site with integrity should be managed as an important resource.

Chapter 6
Formative Era: Context and Research Design

Introduction

The Formative era, as defined by Reed and Metcalf (1999), refers to the period in western Colorado when corn was cultivated by prehistoric peoples. Based on radiocarbon dating of corn macrofossils and ceramic cross-dating of cultural deposits yielding corn, the Formative era extended from approximately 400 B.C. to A.D. 1300. Use of the term "era" instead of "stage" for the period encompassed by the Formative avoids problems in determining the relative importance of corn in overall subsistence systems and permits discussion of both farmers and contemporaneous full-time foragers.

Formative adaptations are best understood in southwestern Colorado, where the Anasazi (Ancestral Pueblo) are represented (see Lipe et al. 1999). The Anasazi fully integrated horticulture into their culture, and so were characterized by low residential mobility, substantial residential and storage architecture, and finely crafted ceramics. The Fremont represented another Formative adaptation, mostly restricted to northwestern Colorado, Utah, and the eastern edge of Nevada. The Fremont also constructed substantial residential and storage structures, manufactured high-quality ceramics, and raised corn, beans, and squash. Sites attributed to the Fremont, however, are highly variable, ranging from large residential villages along the Wasatch Front to short-term campsites with small quantities of Fremont ceramics. The prevalence of short-term occupations suggests that foraging remained an important subsistence activity in the Fremont homeland, possibly indicating the co-occurrence of farming and foraging groups or switching in subsistence and settlement behaviors as climates fluctuated (see Madsen and Simms 1998).

Current evidence suggests that neither the Anasazi nor the Fremont occupied the UPAP study area. Although a small quantity of sites yield Anasazi ceramics, sometimes in association with masonry residential structures and evidence of corn, key aspects of Anasazi culture, such as kivas, are absent in the study area. Site layout and structure design also vary substantially. Fremont sites are also absent in the study area. Fremont ceramics are very rare, as are elaborate clay figurines, leather moccasins, and other diagnostic Fremont artifacts. Residential structures are similar to those of the eastern Fremont, however. Overall, however, the Formative-era sites of the UPAP study area vary from Anasazi and Fremont sites to the degree that they are often described as a separate archaeological unit – the Gateway tradition (Reed 1997). The Gateway tradition is applied to local sites with limited evidence of corn horticulture, low quantities of Anasazi ceramics, and rectangular or oval masonry structures (Reed and Metcalf 1999). Most of the Gateway sites occur on the western side of the Uncompahgre Plateau, in the general vicinity of Norwood and Naturita, Colorado. Gateway tradition sites, however, are relatively rare in the study area, though contemporaneous nonstructural sites are relatively common (Reed and Metcalf 1999). Most of the area's Formative-era sites are campsites, probably representing habitation by comparatively mobile groups primarily engaged in foraging. Certainly, the higher elevations are climatically unsuited for corn horticulture. Reed and Metcalf (1999) have proposed the Aspen tradition to refer to the region's Formative foragers. Although some nonstructural Formative-era sites might represent foraging by Gateway tradition peoples, the predominance of nonstructural sites suggests the existence of groups engaged exclusively in hunting and gathering.

Quality of the Database

There are currently approximately 121 Formative-era sites in the UPAP study area. Nearly 50 of those have been subjected to some degree of archaeological excavation, which is a staggering percentage. Although one might think that such an intensive investigation of a set of sites would result in a thorough understanding of that set, our understanding of the Formative era has been hampered by the poor field and reporting methods and by the history of regional research. The

earliest excavations in the study area focused on the grandest rockshelters and the highly visible masonry architectural sites. Because these investigations generally occurred in the 1930s and 1940s, modern field and analytic techniques, such as radiocarbon dating, macrobotanical and palynological analyses, and detailed archaeofaunal analysis, were seldom or never employed. In the 1960s and early 1970s, such techniques were emerging in the field, but were not often practiced in the study area, for a number of reasons. Debitage – so important for discerning basic lithic reduction strategies and for assessing intensity of site occupation – was not routinely collected on the Ute Prehistory Project (Buckles 1971). Metropolitan State College excavated another substantial set of the region's sites with masonry architecture in the mid 1970s, but the results were not formally reported (though see Crane 1977, 1978). In the section that follows, 21 of the 32 excavated sites discussed were excavated prior to 1976.

As would be expected, the more recent archaeological data are superior to the older data. Survey-level data are, overall, adequate or better. Excavation methods employed since the mid-1970s have been adequate, though reporting is uneven. Adequate or better excavation reports follow the Office of Archaeology and Historic Preservation reporting guidelines; the best permit discernment of discrete components and permit discernment of which artifacts and ecofacts are attributed to which component.

Dated and Excavated Formative Sites on the Uncompahgre Plateau

Although nearly 50 Formative-era components have been excavated in the UPAP study area, the extent of investigations and the value of the resulting interpretations vary greatly. In the section below, brief descriptions of some of the more important sites are presented. Omitted are sites such as those excavated by the Huschers that cannot be tied to known site locations and sites that were minimally excavated or minimally reported. Also omitted are sites such as the Moore and the Casebier rockshelters where the Formative-era materials are not reported separately from materials of other archaeological units.

Christmas Rockshelter (5DT2)

The Christmas Rockshelter was, perhaps, the most important site excavated by the Ute Prehistory Project (Buckles 1971). The site is a large rockshelter with stratified archaeological deposits. It is situated along Roubideau Creek west of Olathe, Colorado. Artifacts dating from the Paleoindian to the Late Prehistoric period were recovered. Buckles (1985) submitted six radiocarbon samples for dating purposes to define the periods of site occupation. These data indicated that Levels 5 and 6 could be attributed to the Formative era. The site's interpretative value is enhanced by the recovery of debitage at the site.

Frank's Shelter (5MN6)

Frank's Shelter was also excavated by the Ute Prehistory Project. The rockshelter is on the lower flank of the Uncompahgre Plateau west of Montrose, Colorado. Three thermal pit features were found, but none was dated by chronometric means. Formative-era affiliation is inferred from the recovery of small corner-notched and stemmed projectile points.

Carlyle Shelter (5MN14)

Carlyle Shelter is a rockshelter excavated by the Ute Prehistory Project northwest of Montrose (Buckles 1971). The site is in the vicinity of Dry Creek. Archaeological deposits at the site were stratified, but small corner-notched projectile points were found in all cultural levels, suggesting multiple reoccupations by Formative-era peoples. Cultural features included unlined fire pits, but none was dated by chronometric means.

Initial Site (5MN17)

The Initial site is northwest of Montrose along the eroding caprock of a mesa. No overhang is present. The site was excavated as part of the Ute Prehistory Project (Buckles 1971). Excavations revealed one large, slab-lined fire pit and a sample of lithic artifacts. No radiocarbon samples were processed. The recovery of small corner-notched and stemmed projectile points in all levels suggests primary occupation during the Formative era.

Shirley's Shelter (5MN28)

Shirley's Shelter, excavated by the Ute Prehistory Project, is west of Montrose. The rockshelter's cultural deposits were stratified, and two unlined thermal features were found. No chronometric dates were obtained. Diagnostic artifacts were dominated by small corner- or side-notched projectile points, suggesting a Formative-era occupation.

Monte's Shelter (5MN30)

Monte's Shelter is west of Montrose between Roubideau and Dry creeks. The rockshelter, excavated as part of the Ute Prehistory Project, contained shallow cultural deposits. The site is attributed to the Formative era on the basis of diagnostic corner-notched and stemmed projectile points, sufficiently small to represent arrow points. Three unlined fire pits were found, but none was dated with chronometric methods.

Squint Site (5MN34)

The Squint site is northwest of Montrose, on the eastern side of Dry Creek. It consists of a scatter of lithic artifacts among large boulders that have detached from rimrock. The boulders offer a fair amount of protection for the site. The site was excavated as part of the Ute Prehistory Project (Buckles 1971). Excavators found stratified cultural deposits that yielded primarily small corner-notched projectile points. The points suggest that site occupation was mostly restricted to the Formative era. Cultural features identified consisted of unlined fire pits. No chronometric dates were obtained at the site.

Bedrock Pit Site (5MN35)

The Bedrock Pit site, excavated as part of the Ute Prehistory Project (Buckles 1971), was named after a large fire pit that was partly excavated into bedrock. The site, located northwest of Montrose, is situated adjacent to a low exposure of bedrock. Cultural deposits generally extended only 1 ft (30 cm) below the modern ground surface. No cultural deposits were chronometrically dated. Affiliation with the Formative era is inferred from the discovery of small corner-notched or stemmed projectile points from multiple excavation levels.

Childer's Site (5MN38)

The Childer's site, situated east of Dry Creek northwest of Montrose, was also excavated as part of the Ute Prehistory Project (Buckles 1971). Like the Initial and Bedrock Pit sites, the Childer's site is adjacent to a vertical sandstone exposure. Soils are heavily charcoal-stained, indicating to Buckles that roasting was an important site activity. Unlike the other two sites, however, no roasting features were identified at the Childer's site, though that may simply represent sampling error. Fire-cracked rock appears to have been abundant in site soils. No radiocarbon dates were obtained. Projectile points recovered consisted of small corner-notched varieties, suggesting that the site dates to the Formative era.

Shavano Spring Site (5MN40)

The Shavano Spring site is west of Montrose in the Shavano Valley. The open site was excavated as part of the Ute Prehistory Project. Although the site had been impacted by recent

ground disturbances, intact, stratified cultural deposits were identified. Two excavation blocks were delineated, separated by a considerable distance and representing different topographic settings. The site investigator, William Buckles (1971), processed two radiocarbon samples from one of the excavation blocks. Levels 4 and 5 in Excavation Unit 1 yielded dates indicative of Archaic- and Formative-era occupations. The radiocarbon assay from Level 4, when calibrated (two sigma) indicates a site occupation sometime between cal 575 and 230 B.C. This occupation probably occurred during the early portion of the Formative period. Formative-era site occupation is also indicated by the recovery of small corner-notched projectile points. Two cultural features were found in Level 4 of Excavation Unit 1. One consisted of a slab-lined fire pit, and the other was a pit thought to represent a cache.

Roubideau Rim Site (5MN55)

The Roubideau Rim site, also investigated by Buckles (1971), is southwest of Delta near Roubideau Creek. There is a small overhang at the site, but a vertical sandstone face was thought to represent the primary focus of site activity (Buckles 1971). Charcoal-stained soils with abundant fire-cracked rock were mounded near the base of the rock outcrop; Buckles interprets these to represent the remains of roasting activities. No cultural features were discovered during excavations, however, and no chronometric dates were obtained. Lithic data suggested that reduction of locally obtained quartzite into tools was an important site activity. Diagnostic artifacts included small corner-notched projectile points and a ceramic sherd not attributable to a specific type.

Frank Bond's Site (5MN57)

The Frank Bond site is along Dry Creek northwest of Montrose. The open site was excavated as part of the Ute Prehistory Project (Buckles 1971). Excavations were conducted in arbitrary levels because of the lack in variation in site sediments. Two slab-lined fire pits were excavated, but no radiocarbon samples were processed. Affiliation with the Formative era is inferred from small stemmed or corner-notched projectile points in all the excavated levels.

Weimer IV (5MN368)

Weimer IV is on the Weimer Ranch along Cottonwood Creek, north of Norwood, Colorado. The site was excavated in mid 1970s by Metropolitan State College. Weimer IV consists of five masonry structures, two of which were excavated (Crane 1977). Both excavated structures were roughly circular and contained central hearths. Abundant lithics and a small sample of Anasazi ceramic sherds were recovered from the structures' fill. A macrobotanical sample from one of the structures yielded corn. Pottery types identified at the site included Moccasin Gray, Gallup Black-on-white, Cortez Black-on-white, and Mancos Black-on-white. Unclassified plain red ware and plain gray ware sherds were also found. The ceramic sample comprises mostly Pueblo II period ceramics, so indicate an occupation sometime between A.D. 900 and 1150. A radiocarbon sample derived from human skeletal material yielded a calibrated range (two sigma) of A.D. 1010 to 1150, in line with the ceramic data.

Hill I Site (5MN517)

Site 5MN517, a number sometimes used to refer to Cottonwood Pueblo, is used herein to refer to the Hill I site, following Crane (1977). The Hill I site is on a low knoll in the valley containing Cottonwood Creek, north of Norwood. Metropolitan State College excavated a rectangular masonry structure atop the knoll, and detected another. A radiocarbon date was processed from the site, but was rejected because it was incompatible with cross-dated ceramics. Artifacts recovered included a small sample of Anasazi ceramics, ground stone, chipped stone tools, as well as unmodified animal bone. Corn was also reported (Crane 1977). The ceramics were predominantly plain gray, though four Cortez Black-on-white sherds were also reported.

Middle Hill (5MN652)

The Middle Hill site is in the Cottonwood Creek Valley on a bench. A small circular structure, built of alluvial cobbles, was excavated by Metropolitan State College (Crane 1977). The structure contained abundant unmodified animal bone, mano and metate fragments, projectile points, and other stone tools. A central fire pit yielded evidence of corn and wild plants. No ceramic artifacts were found, nor was a radiocarbon date obtained. The age of the structure is unknown, though its substantial architecture strongly indicates that it was occupied during the Formative era.

Wagon Bend (5MN653)

The Wagon Bend site is another in the cluster of Formative-era sites on the Weimer Ranch north of Norwood, Colorado. The site is on the north side of the valley containing Cottonwood Creek. Metropolitan State College evidently excavated a single structure at the site. The circular masonry structure contained a central fire pit. Artifacts found included ground stone, 29 projectile points, choppers, knives, scrapers, pottery, and debitage. Unmodified animal bone was also recovered. One radiocarbon date was obtained, but it was substantially earlier than the cross-dated Anasazi ceramics. Only six sherds were found; most were Cortez Black-on-white. Corn was also reported from the site (Crane 1977).

Cottonwood Pueblo (5MN654)

Cottonwood Pueblo is herein referred to as 5MN654. The Office of Archaeology and Historic Preservation refers to the site as both 5MN654 and 5MN517, but the descriptions by the site excavators clearly place the site on the north rim of Cottonwood Creek, whereas site 5MN517 is mapped by Metropolitan State College in the valley bottom on State site forms.

Two excavations have been conducted at Cottonwood Pueblo, a structural habitation site north of Norwood. C.T. Hurst and Western State College conducted excavations at the site in 1947. Of the four masonry "houses" recognized by Hurst (1948a) at the site, one, designated House 4 or Lone Tree House, was excavated. Hurst's excavations revealed a masonry room block consisting of four contiguous rooms. Hurst recovered 134 artifacts during excavation, but it is unlikely that this included debitage. Collected artifacts included ground stone, small corner-notched projectile points, knives, scrapers, hammers, choppers, beads, and pottery. Pottery sherds were classified as Mancos Black-on-white, Wingate Black-on-red, as well as plain gray and corrugated. Crane (1977) also indicates that Hurst excavated a second structure, called Hill Pueblo, that was a mere 68 ft (21 m) from Lone Tree House. Crane (1977) cites a draft report by Hurst (1948b) that is on file at Western State College.

Metropolitan State College excavated House 3 at Cottonwood Pueblo (Crane 1977). They designated House 3 as the Rim site. Masonry walls enclosed an area measuring 10 by 5 m. Excavations revealed bedrock metates, 140 projectile points, scrapers, choppers, knives, bone tools, bone beads, debitage, and ceramic sherds (Crane 1977). One extramural hearth was excavated, and a midden was observed outside the structure. One radiocarbon determination was obtained, but was dismissed because it was substantially earlier than the cross-dated Anasazi ceramics. Anasazi ceramics were identified as Cortez and Mancos Black-on-white and Deadman's Black-on-red. Corn was also recovered at the site.

Battleship (5MN368)

The Battleship site is on a bench overlook Cottonwood Creek on Weimer Ranch. An undetermined area was excavated at the site by Metropolitan State College (Crane 1977). No structures were found, and the area investigated is described as a work area. Numerous artifacts were found, including a single slipped sherd of unknown type. The site is notable in that a human burial was recovered. The adult human was apparently "placed on the surface and covered over by

rocks" (Crane 1977:22). A radiocarbon determination was obtained from the skeleton; when calibrated (two sigma), an occupation dating sometime between A.D. 1010 and 1150 is indicated.

Tabeguache Cave (5MN868)

Tabeguache Cave is a large, north-facing rockshelter along Tabaguache Creek northeast of Nucla, Colorado. The site was excavated by C.T. Hurst of Western State College between 1939 and 1941. Excavations revealed a rock retaining wall across the front of the shelter, reinforced in places with timbers (Hurst 1942). The extensive excavations revealed an exceptional sample of perishable and imperishable artifacts. Perishable artifacts – so rare in the region's archaeological record – included basketry fragments, bone awls, bone beads, dart foreshafts, yucca-leaf sandals, a vegetal "food cake," and a skin bag. Stone artifacts were also common. Four tree-ring dates were processed by Hurst's students; these indicated site occupation during the first few centuries A.D. Stiger (2001b:173) has recently published eight other dendrochronological dates derived from samples collected by Hurst at Tabeguache Cave. All date between A.D. 1 and 48, though the outer rings were often eroded. Western State College recently processed a radiocarbon sample on corn from the site, corrected for isotopic fractionation (Stiger 2001b:172). The corn sample avoids the "old wood problem" often associated with radiocarbon analyses of wood charcoal or dendrochronological analyses in areas where prehistoric peoples lacked efficient wood-cutting technology, so provides a superior date of occupation. When calibrated, the corn indicates an occupation sometime between cal 345 B.C. and A.D. 71. (Stiger 2001b:172). Hurst (1942) attributed the site to the Basket Maker culture.

Tabeguache Cave II (5MN890)

Tabeguache Cave II is in Tabeguache Creek, just a few miles from its confluence with the San Miguel River. Uravan is west of the site. C.T. Hurst and his students from Western State College conducted archaeological excavations at the site between 1942 and 1943. At least two components were recognized: an upper Ute component and a lower Basket Maker component (Hurst 1944). Cultural features included unlined and slab-lined fire pits and "potholes" excavated into the lowermost hardpan clay (Hurst 1945). Corn and squash rind were recovered. Artifacts recovered included perishable items, including cordage, leather, and a dart foreshaft. A variety of stone artifacts was also found. Stiger (2001b) has recently reported a radiocarbon determination from the site that, when calibrated (two sigma), indicates an occupation sometime between A.D. 440 and 760.

Tabeguache Pueblo (5MN1609)

Tabeguache Pueblo is an open architectural site northwest of Nucla, Colorado, atop a ridge overlooking Campbell Creek. The site was excavated in 1945 by C.T. Hurst of Western State College (Hurst 1946). Four "houses" were observed at the site, which constituted noncontiguous masonry room blocks. Rooms were rectangular and were bound by masonry walls. The Southeast and the Southwest Houses were completely excavated. Less intensive excavations – aimed primarily at exposing wall alignments – were conducted at the Northeast and the Northwest Houses. Middens were observed outside the room blocks. Artifacts recovered included small corner-notched arrow points, ground stone, flaked stone tools, beads, and pottery. Unmodified and modified animal bone was also recovered. Diagnostic pottery included Mancos Black-on-white and Lino Gray. The Mancos Black-on-white type indicates a site occupation sometime between A.D. 900 and 1150. Because Anasazi pottery and rectangular masonry architecture was found, Hurst (1946) suggested that the site represented a peripheral Pueblo II habitation.

Oak Hill Site (5MN2628)

The Oak Hill site is southwest of Montrose, Colorado, on the eastern side of Roubideau Canyon. The site was excavated by Alpine Archaeological Consultants as part of the TransColorado pipeline project. The site is a large lithic scatter with multiple, horizontally distributed activity

areas or components. Both Formative- and Protohistoric-era components were identified. The Formative component (Component 1) yielded an unlined fire pit with abundant fire-cracked rock. A radiocarbon sample from the feature indicated a calibrated date range between A.D. 440 and 680 (Cater 2001). Artifacts attributed to the component included two Rosegate arrow points and a small sample of other chipped and ground stone tools. The site was attributed to the Aspen tradition, as it was thought to represent the activities of a Formative-era hunting and gathering group.

5MN3760

Site 5MN3760 is an open lithic scatter a few miles southeast of Naturita, Colorado. Grand River Institute excavated approximately 6.5 m^3 (253 m^2) at the site in advance of planned mining developments (Conner and Hutchins 1992). Excavations focused on the exposure of two thermal features, one of which was slab-lined. One feature dated to the Archaic era, and another yielded a radiocarbon date that, when calibrated (two sigma), indicated an occupation sometime between 756 and 172 B.C. This suggests an occupation during the early Formative era. The site probably represents the remains of people engaged in hunting and gathering.

Transfer Road Hamlet (5MN3876)

Transfer Road Hamlet is west of Montrose near the Transfer Road. Centennial Archaeology, Inc. conducted excavations at the site in advance of construction of the TransColorado natural gas pipeline (Kalasz et al. 2001). Three large blocks were excavated at the site, each at the location of a suspected feature. Excavations revealed three basin houses. Unlined interior and exterior hearths were also found. Artifacts consisted of ground and chipped stone artifacts. Although one grain of corn pollen was found in a soil sample, the site was thought to represent the activities of Aspen tradition hunters and gatherers. Radiocarbon data indicate site occupations sometime between cal A.D. 1 and 500.

5MN4082

Site 5MN4082 was excavated by Centennial Archaeology as part of the TransColorado pipeline project (Slessman et al. 2001). Although 70 m^2 was shallowly excavated, less information was recovered than anticipated. One unlined hearth with fire-cracked rock was found; it yielded a radiocarbon determination with a calibrated range (two sigma) of A.D. 660 to 890. A variety of stone artifacts was recovered, including small- and medium-sized notched projectile points. The site was interpreted as a "way station" by peoples engaged in hunting and gathering activities.

Schmidt Site (5MN4253)

The Schmidt site is northwest of Norwood, Colorado, on a mesa top near Maverick Draw. The site is huge – nearly a mile long – and contains at least five artifact concentrations (Greubel and Cater 2001). Excavations were conducted at four of the concentrations, designated Loci 1, 2, 3, and 6, in advance of construction of the TransColorado natural gas pipeline. Multiple components were identified, at least three of which are attributable to the Formative era. The primary Formative components included Locus 2, Component 1; Locus 2, Component 2; and Locus 3, Component 1. Locus 2, Component 1 yielded three thermal features and a sample of lithic artifacts. The lithic artifacts included small, arrow-sized projectile points, as well as larger varieties. The radiocarbon dates from the three features, when pooled, indicated an occupation sometime between cal 400 and 180 B.C. Locus 2, Component 2 yielded two thermal features. The features yielded radiocarbon determinations that, when calibrated (two sigma), indicated occupations between 150 B.C. and A.D. 230 and between A.D. 140 and 420. Dart points and other stone tools were associated with this component. Two early Formative-era basin houses were discovered at Locus 3, Component 1. One structure was radiocarbon dated between 130 cal B.C. and cal A.D. 120, and the other was dated between 235 cal B.C. and cal A.D. 30. Charred corn was found in one of the structures. Artifacts included two arrow points, one of which was identified as Rosegate.

5OR179

Site 5OR179 was just west of the Uncompahgre River near Ridgway Reservoir. The open lithic scatter was excavated as part of the Old Dallas Historical Archaeological Program, conducted in advance of inundation of the reservoir's pool area. Site 5RO179 was relatively large and had at least 12 concentrations of surface artifacts. These were sampled to varying levels; some were surface collected, and others were the locus of excavations. In the area designated Subdatum 9, charcoal from excavation levels were combined for dating purposes. A radiocarbon determination with an associated calibrated age range (two sigma) of 760 to 100 B.C. was obtained. Two unlined hearths were discovered during excavation of another concentration, referred to as Subdatum 10 (Muceus and Lawrence 1986). The calibrated ranges (two sigma) for the radiocarbon samples derived from the two features were 350 B.C. to A.D. 235 and A.D. 75-330. A small sample of chipped and ground stone artifacts were recovered at Subdatum 10. Whether artifacts from other concentrations are associated with the Formative-era components identified by radiocarbon analysis cannot be determined. Possible early Formative-era occupations of the site are indicated.

5OR182

Site 5OR182 was also excavated at the present location of Ridgway Reservoir. Like 5OR179, it, too, was on a bench just west of the Uncompahgre River (Muceus and Lawrence 1986). Excavations focused on superimposed roasting features identified during testing and a surface cluster of ground stone artifacts. The superimposed roasting features were designated Feature 1. Three radiocarbon samples were collected from combined proveniences or mixed strata at Feature 1. Two other samples from single proveniences may provide the best indication of the feature's age. These two samples suggest that Feature 1 has a two-sigma calibrated range of 50 B.C. to A.D. 400. An early Formative-era occupation is indicated. A sample of chipped and ground stone artifacts was recovered at the site, but interpretive data are limited.

5OR198

Site 5OR198 was also excavated as part of the Old Dallas Historical Archaeological Program (Muceus and Lawrence 1986). It was on a bench on the western side of the Uncompahgre River. Excavations focused on cultural features evident on the ground surface. Three features were exposed -- all hearths – and small blocks around them were excavated. The three features were sampled for radiocarbon analysis. The resulting calibrated ranges (two sigma) are A.D. 970-1215, A.D. 660-970, and A.D. 220-425. Three Formative-era occupations of the site are indicated. Small quantities of stone artifacts and animal bones were recovered during excavations. Projectile points include a small stemmed point that probably tipped an arrow.

5OR243

Site 5OR243 was on the first terrace above the Uncompahgre River in the Old Dallas Historical Archaeological Program project area (Muceus and Lawrence 1986). The open lithic scatter revealed two areas that probably represent degraded cultural features. Both are too unpatterned to merit designation as hearths. Radiocarbon samples were collected from the two suspected features; these determinations had calibrated ranges (two sigma) of 200 B.C to A.D. 80 and A.D. 240 to 540. Charcoal was also collected from two excavation levels. These had calibrated ranges of 100 B.C. to A.D. 120 and 200 B.C. to A.D. 80. Additionally, a sample from mixed proveniences was processed; it is not herein reported because of the availability of more suitable samples. Radiocarbon data indicate an early Formative-era site occupation. A Formative-era occupation is also supported by macrobotanical data. Feature 1 yielded fragments of either squash or gourd seeds.

5OR317

Site 5OR317 was also in the Ridgway Reservoir pool area. It was on the second terrace west of the Uncompahgre River; it consisted of multiple surface artifact concentrations (Muceus and

Lawrence 1986). Excavations revealed a single cultural feature. The feature, an unlined hearth, yielded an Archaic date. A variety of projectile points was recovered at the site, including small corner- and side-notched types that indicate a Formative reoccupation of the site.

Simpson Wickiup Site (5SM2425)

The Simpson Wickiup site was excavated by Alpine Archaeological Consultants as part of the TransColorado pipeline project. Although the site was primarily occupied by the Ute, a Formative-era component was also detected. Four features were found that were attributed to the Formative component. Radiocarbon dates from three features were statistically contemporaneous. When pooled, the radiocarbon determinations yielded a calibrated range (two sigma) of A.D. 660 to 890. A fourth feature was not contemporaneous; it yielded a calibrated range of A.D. 780 to 1150. Three projectile points were recovered in the component, including a San Rafael Stemmed point, a Rosegate point, and a Uinta Side-notched point. A sample of other lithic artifacts was also recovered. The component was interpreted as a short-term residential base inhabited by foragers (Greubel 2001).

Fallen Deer Site (5SM2578)

The Fallen Deer site was excavated to mitigate the impacts of a land exchange between the Forest Service and a private party (McDonald 1998). The site is an open sherd and lithic scatter at the southern end of the Uncompahgre Plateau northwest of Placerville, Colorado. A total of 16 m² was excavated, 12 of which were in a contiguous block. No cultural features were found, and no chronometric dates were obtained. Artifacts recovered included small side-notched arrow points, bifaces, flake tools, debitage, and ceramic sherds. One piece of debitage was obsidian; it was traced to the Polvadera Peak source in New Mexico. Seventeen sherds were excavated, all representing Anasazi types. Types identified included Mancos Gray and Mancos Corrugated; untyped painted white ware and gray ware sherds were also found. The types found suggest a site occupation during the period between A.D. 900 and 1150 – possibly towards the earlier end of that period. Unmodified animal bone was recovered and identified. The site was interpreted as a faunal processing locale (McDonald 1998).

Modeling the Formative-Era Occupation

Chronology

A total of 79 radiocarbon determinations from 34 sites have been processed in the UPAP study area (Table 27). Compilations of regional radiocarbon data indicate a peak during the Formative era (e.g., Reed and Metcalf 1999). The relative abundance of dates suggests dramatic population growth during this era. A focus on Formative sites by archaeologists might explain such a peak in the radiocarbon record in some areas, but not in west-central Colorado. Although early archaeologists in the region focused on Formative architectural sites and large rockshelters because of their high visibility, their investigations occurred before the development or routine application of radiocarbon dating. Most Formative-era sites that have been excavated in recent years, when radiocarbon dating was available, consist of nonstructural sites that appear much like Archaic sites.

To assess the nature of the Formative-era chronology within the UPAP study area, the Formative components at substantially excavated sites were assigned "best dates." The dates were based on radiocarbon determinations, tree-ring studies, or on cross-dating of Anasazi ceramic types. "Best date" usually represents the excavator's assessment of the most reliable dating method. In some cases, the "best dates" represent the subjective interpretation of this writer regarding the most accurate dating data. Formative-era dates are presented in Figure 10. The dates based on radiocarbon determinations generally represent two-sigma calibrated ranges; when single sites have multiple dates that do not overlap, multiple occupations are represented.

Table 27. Formative-Era Radiocarbon Dates.

Site	Site Name	Sample No.	Radiocarbon Assay B.P.	Calibrated Range (2 sigma)	Dated Material	13C/12C Ratio	Reference
5DT2	Christmas Rockshelter	Beta-12980	1280 ± 70	A.D. 645-945	Charcoal	-25 o/oo	Buckles 1985
5DT2	Christmas Rockshelter	Beta 13995	1300 ± 70	A.D. 635-890	Charcoal	-25 o/oo	Buckles 1985
5ME6378	—	Beta-37842	1450 ± 80	A.D. 430-760	Charcoal	?	Piontkowski 1990
5MN40	Shavano Springs	Isotope 820	2100 ± 200	760 B.C.-A.D. 380	Charcoal	?	Buckles 1971
5MN43	Sanburg Site	Beta-13054	2280 ± 80	510-125 B.C.	Charcoal	-25 o/oo	Buckles 1985
5MN273	—	Beta-130974	1490 ± 70	A.D. 430-660	Charcoal	-25 o/oo	Eckman et al. 2001
5MN368	Weimer IV	Uga-1274	--	A.D. 1010-1080	Bone?	?	Crane 1977
5MN519	Cottonwood Cave	Beta-36438	2220 ± 80	405-55 B.C.	Corn	?	Stiger 2001b
5MN653	Wagon Bend	Uga-1375	--	A.D. 515-645	Unknown	?	Crane 1977
5MN868	Tabeguache Cave	Beta-76546	2060 ± 60	345-225 B.C.	Corn	?	Stiger 2001b
5MN890	Tabeguache Cave II	Beta-76547	1430 ± 60	A.D. 440-760	Corn	?	Stiger 2001b
5MN1365	—	Uga-3317	1515 ± 85	A.D. 390-670	Charcoal	?	Horvath 1980
5MN2628	Oak Hill	Beta-117371	1450 ± 60	A.D. 440-680	Charcoal	-25 o/oo	Cater 2001
5MN2629	—	Beta-36043	810 ± 90	A.D. 1025-1390	Charcoal	?	Greubel 1989
5MN2922	—	Beta-19355	880 ± 50	A.D. 1030-1280	Charcoal	?	McDonald 1987
5MN3760	—	Beta-45803	2300 ± 80	750-170 B.C.	Charcoal	?	Conner and Hutchins 1992
5MN3859	Coalbank Canyon	Beta-131497	2060 ± 60	345 B.C.-A.D. 70	Sediment	?	Kalasz et al. 2001
5MN3859	Coalbank Canyon	Beta-131496	1970 ± 70	160 B.C.-A.D. 220	Sediment	?	Kalasz et al. 2001
5MN3876	Transfer Road Hamlet	Beta-131512	1930 ± 70	90 B.C.-A.D. 245	Charcoal	?	Kalasz et al. 2001
5MN3876	Transfer Road Hamlet	Beta-131513	1900 ± 50	A.D. 0-240	Sediment	?	Kalasz et al. 2001
5MN3876	Transfer Road Hamlet	Beta-131510	1880 ± 70	40 B.C.-A.D. 320	Charcoal	?	Kalasz et al. 2001
5MN3876	Transfer Road Hamlet	Beta-131519	1900 ± 50	A.D. 0-240	Charcoal	?	Kalasz et al. 2001
5MN3876	Transfer Road Hamlet	Beta-131514	1490 ± 70	A.D. 425-660	Charcoal	?	Kalasz et al. 2001
5MN3876	Transfer Road Hamlet	Beta-131515	960 ± 60	A.D. 980-1210	Sediment	?	Kalasz et al. 2001
5MN3876	Transfer Road Hamlet	Beta-131517	1840 ± 80	A.D. 0-380	Charcoal	?	Kalasz et al. 2001
5MN3876	Transfer Road Hamlet	Beta-131516	1840 ± 60	A.D. 30-340	Charcoal	?	Kalasz et al. 2001
5MN3876	Transfer Road Hamlet	Beta-131520	1420 ± 70	A.D. 440-770	Charcoal	?	Kalasz et al. 2001
5MN3876	Transfer Road Hamlet	Beta-131518	2040 ± 70	320 B.C.-A.D. 125	Charcoal	?	Kalasz et al. 2001
5MN3876	Transfer Road Hamlet	Beta-131521	1590 ± 60	A.D. 260-615	Charcoal	?	Kalasz et al. 2001
5MN3880	—	Beta-130978	1880 ± 40	A.D. 60-240	Charcoal	-25 o/oo	Eckman et al. 2001
5MN3880	—	Beta-130979	1050 ± 80	A.D. 780-1660	Charcoal	-25 o/oo	Eckman et al. 2001
5MN3881	—	Beta-130980	1230 ± 70	A.D. 670-960	Charcoal	-25 o/oo	Eckman et al. 2001
5MN3881	—	Beta-130981	1410 ± 70	A.D. 470-770	Charcoal	-25 o/oo	Eckman et al. 2001
5MN3883	—	Beta-130983	1140 ± 60	A.D. 730-1015	Charcoal	-25 o/oo	Eckman et al. 2001
5MN3883	—	Beta-130982	1370 ± 60	A.D. 560-780	Charcoal	-25 o/oo	Eckman et al. 2001
5MN3887	—	Beta-115884	1650 ± 50	A.D. 250-540	Charcoal	-25 o/oo	Eckman et al. 2001
5MN3887	—	Beta-130984	2130 ± 60	360 -0 B.C.	Charcoal	-25 o/oo	Eckman et al. 2001

Table 27. Formative-Era Radiocarbon Dates.

Site	Site Name	Sample No.	Radiocarbon Assay B.P.	Calibrated Range (2 sigma)	Dated Material	13C/12C Ratio	Reference
5MN3888	—	Beta-130985	1440 ± 60	A.D. 440-690	Charcoal	-25 o/oo	Eckman et al. 2001
5MN3888	—	Beta-130987	1630 ± 60	A.D. 260-560	Charcoal	-25 o/oo	Eckman et al. 2001
5MN4081	—	Beta-130988	1490 ± 60	A.D. 440-650	Sediment	-25 o/oo	Eckman et al. 2001
5MN4082	—	Beta-131522	1270 ± 60	A.D. 660-890	Charcoal?	?	Slessman et al. 2001
5MN4253 Locus 2	Schmidt Site	Beta-117123	2300 ± 60	530-180 B.C.	Charcoal	-25 o/oo	Greubel and Cater 2001
5MN4253 Locus 2	Schmidt Site	Beta-117125	2300 ± 40	410-210 B.C.	Charcoal	-20.8 o/oo	Greubel and Cater 2001
5MN4253 Locus 2	Schmidt Site	Beta-117122	2150 ± 60	370-50 B.C.	Charcoal	-25 o/oo	Greubel and Cater 2001
5MN4253 Locus 2	Schmidt Site	Beta-127857	1960 ± 70	150 B.C.-A.D. 230	Charcoal	-25 o/oo	Greubel and Cater 2001
5MN4253 Locus 2	Schmidt Site	Beta-127858	1740 ± 60	A.D. 140-420	Charcoal	-25 o/oo	Greubel and Cater 2001
5MN4253 Locus 2	Schmidt Site	Beta-117128	1150 ± 50	A.D. 770-995	Charcoal	-25 o/oo	Greubel and Cater 2001
5MN4253 Locus 2	Schmidt Site	Beta-117126	1010 ± 50	A.D. 900-1160	Charcoal	-25 o/oo	Greubel and Cater 2001
5MN4253 Locus 2	Schmidt Site	Beta-117118	990 ± 50	A.D. 910-1180	Charcoal	-25 o/oo	Greubel and Cater 2001
5MN4253 Locus 3	Schmidt Site	Beta-117464	1900 ± 70	45 B.C.-A.D. 320	Charcoal	-25 o/oo	Greubel and Cater 2001
5MN4253 Locus 3	Schmidt Site	Beta-117465	2120 ± 90	380 B.C.-A.D. 30	Charcoal	-25 o/oo	Greubel and Cater 2001
5MN4253 Locus 3	Schmidt Site	Beta-139119	2010 ± 40	140 B.C.-A.D. 80	Corn	-11.2 o/oo	Greubel and Cater 2001
5MN4253 Locus 3	Schmidt Site	Beta-117466	2060 ± 70	350 B.C.-A.D. 120	Charcoal	-25 o/oo	Greubel and Cater 2001
5MN4253 Locus 3	Schmidt Site	Beta-117467	2110 ± 90	380 B.C.-A.D. 50	Charcoal	-25 o/oo	Greubel and Cater 2001
5MN4253 Locus 3	Schmidt Site	Beta-139120	2110 ± 40	350-0 B.C.	Corn	-9.4 o/oo	Greubel and Cater 2001
5MN4253 Locus 3	Schmidt Site	Beta-117462	2240 ± 70	400-100 B.C.	Charcoal	-25 o/oo	Greubel and Cater 2001
5MN4253 Locus 3	Schmidt Site	Beta-117463	2210 ± 80	400-60 B.C.	Charcoal	-25 o/oo	Greubel and Cater 2001
5MN4255	—	Beta-130995	2320 ± 60	750-200 B.C.	Charcoal	-25 o/oo	Eckman et al. 2001
5OR179	—	Beta-1968	2010 ± 100	350 B.C.-A.D. 235	Charcoal	?	Muceus and Lawrence 1986

Table 27. Formative-Era Radiocarbon Dates.

Site	Site Name	Sample No.	Radiocarbon Assay B.P.	Calibrated Range (2 sigma)	Dated Material	13C/12C Ratio	Reference
5OR179	—	Beta-2635	2300 ± 100	760-100 B.C.	Charcoal	?	Muceus and Lawrence 1986
5OR179	—	Beta-2637	1840 ± 50	A.D. 75-330	Charcoal	?	Muceus and Lawrence 1986
5OR182	—	Beta-2151	1860 ± 90	40 B.C-A.D. 400	Charcoal	?	Muceus and Lawrence 1986
5OR182	—	Beta-2639	1870 ± 70	A.D. 0-340	Charcoal	?	Muceus and Lawrence 1986
5OR182	—	Beta-2640	1910 ± 90	90 B.C.-A.D. 340	Charcoal	?	Muceus and Lawrence 1986
5OR182	—	Beta-2638	2030 ± 80	200 B.C.-A.D. 140	Charcoal	?	Muceus and Lawrence 1986
5OR198	—	Beta-1969	980 ± 60	A.D. 970-1215	Charcoal	?	Muceus and Lawrence 1986
5OR198	—	Beta-2455	1250 ± 70	A.D. 660-970	Charcoal	?	Muceus and Lawrence 1986
5OR198	—	Beta-2641	1730 ± 50	A.D. 220-425	Charcoal	?	Muceus and Lawrence 1986
5OR243	—	Beta-1970	2060 ± 60	200 B.C.-A.D. 80	Charcoal	?	Muceus and Lawrence 1986
5OR243	—	Beta-2643	2000 ± 50	100 B.C.-A.D. 120	Sediment	?	Muceus and Lawrence 1986
5OR243	—	Beta-2456	1680 ± 60	A.D. 240-540	Charcoal	?	Muceus and Lawrence 1986
5OR243	—	Beta-2644	2220 ± 80	400-45 B.C.	Charcoal	?	Muceus and Lawrence 1986
5SM2423	Broken Leg	Beta-115886	1670 ± 70	A.D. 220-550	Sediment	-25 o/oo	Firor 2001
5SM2425	Simpson Wickiup	Beta-127192	1350 ± 60	A.D. 570-810	Charcoal	-25 o/oo	Greubel 2001
5SM2425	Simpson Wickiup	Beta-127190	1230 ± 70	A.D. 670-960	Charcoal	-25 o/oo	Greubel 2001
5SM2425	Simpson Wickiup	Beta-127197	1240 ± 50	A.D. 670-890	Charcoal	-25 o/oo	Greubel 2001
5SM2425	Simpson Wickiup	Beta-127183	1070 ± 50	A.D. 790-1150	Charcoal	-25 o/oo	Greubel 2001
5SM2426	—	Beta-131025	1210 ± 40	A.D. 690-940	Charcoal	-25 o/oo	Eckman et al. 2001
5SM2426	—	Beta-131026	1280 ± 40	A.D. 660-860	Charcoal	-25 o/oo	Eckman et al. 2001

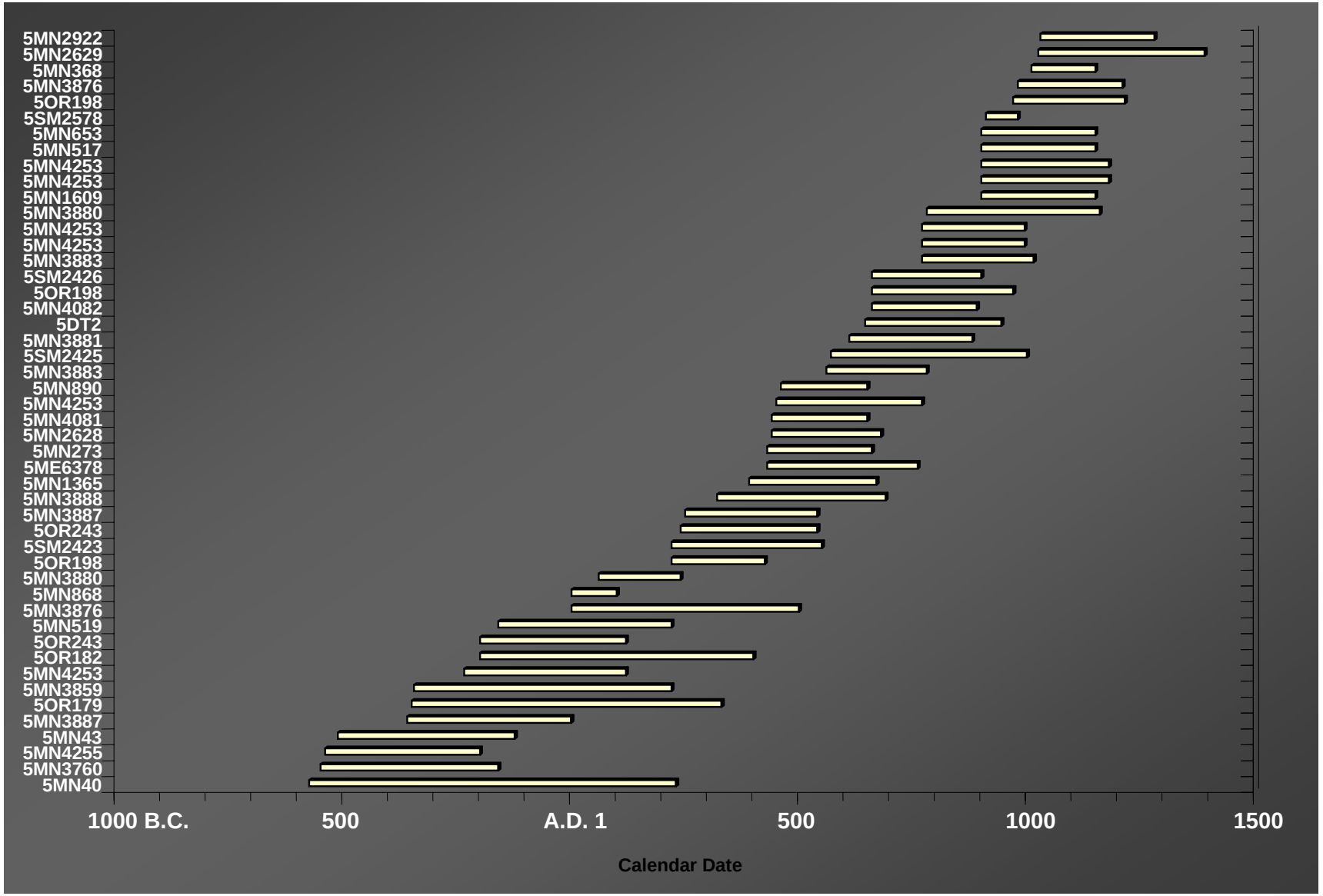


Figure 10. "Best dates" for Formative-era components.

The dated components indicate a fairly continuous occupation of the study area between the beginning of the Formative era at approximately 400 B.C. to its end at A.D. 1300. Although subsistence and settlement practices may have varied through time, the study area remained occupied.

Archaeological Units

As indicated by Reed and Metcalf (1999), the utility of the archaeological units defined in the study area should be further evaluated. Buckles's (1971) phase system developed as part of the Ute Prehistory Project has been shown to be unworkable (e.g., Horn et al. 1987) and was further undermined by a subsequent set of radiocarbon dates obtained by Buckles (1985) for Christmas Rockshelter. Reed's (1997) Gateway tradition and Reed and Metcalf's (1999) Aspen tradition attempt to provide some means of reference for local Formative-era sites, but have not be widely evaluated. Moreover, the discovery of corn at the Schmidt site and the Transfer Road Hamlet on the TransColorado pipeline project (Reed 2001) – two sites with basin houses and residential mobility intermediate between the masonry sites of Weimer Ranch and the campsites of hunters and gatherers – has blurred the distinction between the Gateway and Aspen traditions. The apparent hiatus in horticulture in west-central Colorado during the middle portion of the Formative era also poses new problems for regional classificatory schemes. Charles and Cole (2003) attribute the early period of horticulture in western Montrose County to the Basketmaker II culture, as did C.T. Hurst in the 1940s. Early Formative lifeways and technologies are similar over a broad area, so even many early "Fremont" sites could be included under the Basketmaker II rubric, along with the early sites in the UPAP study area. The utility of such a "lumping" approach should also be carefully evaluated, however. Because an increase in size of the archaeological database usually results in recognition of small-scaled variation, locally derived archaeological units will probably be more appropriate in the long run, as genetic and cultural variation are more fully understood.

Determination of the period or periods when corn was cultivated in the study area is another important research topic. There are currently 10 sites in the study area with corn and/or squash remains that have been reasonably well dated. Dating methods includes radiocarbon and dendrochronological analysis and ceramic cross-dating. As indicated in Table 28, corn use appears to have been restricted to two periods. The first period is roughly coeval with the Basketmaker II period of southwestern Colorado; study area sites of this period range from approximately cal 200 B.C. to A.D. 500. The second period, dated primarily by ceramic cross-dating, dates between approximately cal A.D. 900 and 1150. These sites yielded Pueblo II period Anasazi ceramics, which have been accurately dated by dendrochronology in the Southwest. There currently appears to be a 400-year-long hiatus in corn use or production in the study area. The dearth of Basketmaker III and Pueblo I period Anasazi ceramics in the area suggests that the lacuna reflects an abandonment of horticultural practices in the study area for that period. The chronometric database is small, however, so additional efforts to date components yielding cultigens are necessary.

Subsistence

When the context for the northern Colorado River basin was prepared, two basic models of Formative-era subsistence were proffered (Reed and Metcalf 1999). One model concerned the Gateway tradition, and the second concerned the Aspen tradition. The Gateway subsistence model was developed by Crane (1977), who reported on Metropolitan State College's excavations at the Weimer Ranch sites. In Crane's model, primary residential sites, with masonry structures, Anasazi ceramics, and evidence of corn, were the locus of horticultural activities. Corn was planted in the vicinity of the structural sites in June. Logistically organized groups would then travel to the higher elevations to hunt and gather. Groups aggregated again in the late summer, when corn was harvested and processed for winter use. Wild plants and animals were also taken. Peoples subsisted on stored domestic and wild resources through the winter months, augmenting their diet with available game. Hunting and gathering resumed in the lower elevations near the structural sites in

the spring, until it was time to plant. Although Crane's model seems feasible for the structural sites near Norwood and Naturita, it does not seem applicable to the Jeff Lick Stone Circle site (5MN3462), which is situated atop the Uncompahgre Plateau at an elevation of 2,914 m (9,560 ft).

Table 28. Dated Sites with Cultigens.

Site Age or Estimate	Site Number	Site Name
235 B.C. to A.D. 120	5MN4253	Schmidt Site
200 B.C. to A.D. 75	5OR243	--
160 B.C. to A.D. 220	5MN519	Cottonwood Cave
A.D. 1 to 100	5MN868	Tabeguache Cave
A.D. 1 to 500	5MN3876	Transfer Road Hamlet
A.D. 460 to 650	5MN890	Tabeguache Cave II
A.D. 900 to 1150	5MN368	Weimer Ranch IV
A.D. 900 to 1150	5MN653	Wagon Bend, Weimer Ranch
A.D. 900 to 1150	5MN654	Cottonwood Pueblo
A.D. 900 to 1150	5MN517	Hill I

Aspen tradition subsistence was based on hunting and gathering. Because the ethnographic record suggests that hunters and gatherers frequently traded with local farmers (Kelly 1995), it is possible that some corn might be found in Aspen tradition contexts; horticulture, however, was not practiced. Aspen tradition hunting and gathering practices were at least superficially like those of Archaic peoples. An "up-down" settlement mode was employed, wherein groups spent winters in the lower elevations, where over-wintering deer and elk were exploited, along with smaller animals. There may also have been some reliance on stored food resources. With the arrival of spring, logistical groups or small foraging bands may have traveled to the lowest elevations in the study area, where the growing season first begins and resources such as greens and shoots were available. Groups would then progress into higher elevations, following the elevational progression of the growing season and game animals. The warmest months were spent in the higher elevations. There, warm temperatures and moist conditions permit abundant plant growth which, in turn, permits relatively high faunal carrying capacity. With the arrival of late summer, nuts and berries were collected. By fall, efforts were probably made to dry meat and plant foods for winter storage.

These models may be too simplistic. Sites that outwardly appear to represent the remains of foragers are increasingly yielding evidence of corn, as palynological and macrobotanical sampling has become more commonplace. Archaeological excavations associated with the TransColorado pipeline project revealed two additional lithic scatters with evidence of corn. Small quantities of charred corn kernels were recovered within two basin houses at Locus 3 of the Schmidt site (5MN4253) near Norwood, Colorado. The rather insubstantial structures were chronometrically dated between cal 355 B.C. and A.D. 120. The excavators suggested that the site occupants were primarily hunters and gatherers who either grew small quantities of corn or obtained it in trade (Greubel and Cater 2001). The Transfer Road Hamlet site (5MN3876), just west of Montrose, Colorado, yielded a grain of corn pollen in a soil sample derived from a Formative-era basin house. The basin house was dated through radiocarbon analysis between 92 cal B.C. and A.D. 244 (Kalasz et al. 2001). Site excavators minimized the importance of corn to the prehistoric occupants of the Transfer Road Hamlet.

Although some portions of the UPAP study area were undoubtedly unsuited for corn production, an elevation band characterized by sufficiently long growing seasons and adequate moisture exists. Corn requires a growing season of approximately 110 days and requires at least 355 mm (14 in.) of precipitation (Petersen 1988). Annual precipitation on the Uncompahgre Plateau

ranges from 8 to 20 in., dependent on elevation (Reed and Metcalf 1999). The towns of Delta and Gateway – both just outside of the UPAP study area -- currently average 138 and 162 frost-free days per year, respectively, indicating that a sufficient number of frost-free days occurs on the lower portion of the plateau. It is possible, therefore, that corn was grown within the study area and was more important in Formative-era subsistence in the study area than previously thought.

Barlow (2002) has recently applied optimal foraging theory to the study of Fremont horticulture in Utah and has concluded that it may have made good sense, from an energetic standpoint, to engage in limited horticulture during the Formative era. According to Barlow, the energetic yields of corn horticulture in areas such as the Colorado Plateau are similar to those from hunting and gathering. She bases her interpretations on ethnographic data from several Latin American groups that employ comparatively traditional farming methods. Her research suggests that farming with simple hand tools can yield between 300 and 1,800 kcal per hour, which is similar to the returns from wild resources occurring in the Fremont homeland. Barlow asserts that, when wild resources are abundant, farming is unnecessary because sufficient yields can be obtained by hunting and gathering, with less work. As encounter rates diminish, however, such as in an area where human pressures reduce the availability of highly ranked food resources, farming is likely to occur. The labor investment in farming is likely to remain low until only lower ranked wild food resources are consistently encountered. As investment in labor grows, and with it, commitment to a more sedentary lifeway, a feedback loop emerges, because the decreased mobility results in further reduction in the availability of highly ranked resources (Barlow 2002).

Barlow (2002) identified four types of traditional farming practices, which are along a continuum from very little investment in labor to intensive investment in labor. The least labor-intensive method, termed the Plant-and-Harvest model, entails planting with digging sticks with no field preparation. Plants are then unattended until harvest, so that wild resources can be procured. Corn yields are low, averaging only two to five bushels per acre, and energetic payoffs are about 1,300 to 1,700 kcal per hour. Residential mobility is relatively high, and lower-ranked resources are not extensively exploited. Barlow's (2002) Slash-and-Burn model involves clearing of fields and limited soil preparation prior to planting. Fields receive little attention during the growing season. Fields yield between five and 15 bushels per acre with an energetic return of about 1,100-1,500 kcal per hour. This strategy is thought to be associated with a wider range of wild resources, some representing lower ranked foods (Barlow 2002). The two other farming types recognized by Barlow involve even greater labor investment, but energetic returns are lower. These are not herein discussed because Barlow does not think that they were manifest in the Fremont culture area.

Macrobotanical data from the TransColorado pipeline project suggest that the Formative-era sites north of the San Juan Mountains evince a wider range of plant resources than any other regional archaeological unit (Reed et al. 2001). Increased diet breadth implies inclusion of lower ranked food resources. The project's faunal data also support this trend of increased use of lower ranked food resources; the project's Aspen tradition sites yielded larger percentages of small animal bones than the Archaic or Ute sites (Reed et al. 2001). The percentages of identified small animal bones for the Aspen unit were comparable to those of the Anasazi. A partial explanation of the increase in diet breadth during the Formative era in west-central Colorado might lie in population growth. Compilations of the region's radiocarbon data indicate a prehistoric population peak during the Formative era (Reed and Metcalf 1999). Due to the nature of the region's Formative-era sites and the history of investigations, bias from over-selection of Formative sites by excavators is unlikely. Expansion of diet breadth during the Formative era – and, inclusion of lower rank animal and plant resources -- suggests that the setting was appropriate for the inclusion of horticulture into regional subsistence systems, even among groups that were relatively mobile and dependent on hunted and gathered resources. The recovery of corn at such sites as the Schmidt site and Transfer Road Hamlet suggests that groups that outwardly appear as dedicated foragers also raised corn. That evidence of corn is minimal suggests that these groups incorporated methods of corn production

that involved relatively little investment of labor, such as Barlow's (2002) Plant-and-Harvest method. Hunting and gathering with substantial residential mobility remained key elements of the lifeway. The model that relatively mobile groups primarily reliant on hunting and gathering engaged in limited and unintensive horticulture merits needs to be further evaluated with excavation data.

Changes in subsistence practices through time should also be assessed by future research. Although both structural and nonstructural sites in the study area have yielded evidence of corn, it is possible that late Formative-era groups relied more heavily on corn than early Formative-era groups. Although Crane's subsistence model for late Formative-era groups (Gateway tradition) is similar to Plant-and-Harvest or Slash-and-Burn models developed by Barlow (2002) and herein applied to what appears to have been forager sites, it is possible that reliance on corn increased through time. As noted above in the section on Formative-era chronology, horticultural sites in the study area appear to date to two periods. The first period, represented by such sites as Cottonwood Cave, the Schmidt site, and Transfer Road Hamlet, extends between approximately cal 200 B.C. and A.D. 400. These sites yield varying amounts of corn – sometimes in corn caches – in rockshelters and in basin houses. The second period dates to approximately cal A.D. 900, based on cross-dating of Anasazi ceramics. The latter period is represented by Gateway tradition sites, such as Cottonwood and Tabeguache Pueblos and the Weimer Ranch sites. The Gateway tradition sites are much more substantial than the early sites, in terms of investment of labor for residential architecture. The greater investment in labor for residential structures probably reflects anticipated length of occupation. It is likely, therefore, that the later horticulturalists were less residentially mobile than the early horticulturalists. The reduction in residential mobility is probably associated with minor differences in subsistence practices. It might be expected, for example, that the later sites would evidence greater use of lower ranked plant and animal foods than the earlier sites. Direct evidence of late-period subsistence is minimal, however.

Settlement Patterns

Settlement patterns changed dramatically in the UPAP study area during the Formative era. Residential mobility decreased, a changed linked to the adoption of horticulture by some of the region's inhabitants. Reduced residential mobility is evidenced by an increase occupation of rockshelters and by an increase in labor investment of residential structures. Early in the era, basin houses were constructed, a house type that appeared in earlier archaeological units. By the late Formative era, substantial masonry structures, such as Cottonwood and Tabeguache Pueblos and the Weimer Ranch structures, were constructed. Such structures probably served to secure and mark as occupied highly desirable locations, as well as to provide sufficient space for habitation and storage. The actual length of occupation of these substantial structures is unknown, though it was almost certainly longer than the length of occupation of sites with simpler basin houses or ephemeral brush structures. Some of the sites on or near Cottonwood Creek north of Norwood had middens, indicative of a fairly long period of occupation (Crane 1977).

As discussed in the chapter on the Archaic era, anticipated residential mobility is thought to have considerable explanatory power for variability between archaeological sites. Following the same criteria discussed in the Archaic chapter, the Formative-era sites in the study area for which substantial excavation data are available are placed into the four mobility categories as defined by Kent (1992). The categories (or groups) are as follows: (1) anticipated long-term, actual long term; (2) anticipated long term, actual short term; (3) anticipated short term, actual long term; and (4) anticipated short term, actual short term. The resulting classifications should be regarded with some caution, because the data available for some of the sites are scant, and because archaeological data recovery methods, such as screening, may not have been employed during some of the earlier excavations. There has also been a bias toward selecting for excavation sites with easily visible residential architecture and sites in prominent rockshelters. Such bias results in overrepresentation of long-term habitation sites. Regardless of these biases, the general trend for reduced residential

mobility — as reflected by greater frequencies of sites representing anticipated long-term occupation — will probably be substantiated in future research.

As shown in Table 29 through Table 32, anticipated long-term, actual long-term sites are common among the excavated sites. These sites include the masonry residential structures in western Montrose County and some of the larger rockshelters. These sites yield abundant and diverse artifacts, evince investment of substantial labor in feature or structure construction, and are often is protected settings. Thirty-six percent of the sites in the sample are classified into this mobility group, referred to in the tables as mobility "Group 1." "Group 2" sites reflect anticipated long-term, but actual short-term site occupation. Fifteen percent of the sites in the sample are so classified. These sites also evidence substantial investment in feature or structure construction, but are characterized by relatively few artifacts. "Group 3" sites are thought to represent anticipated short-term, actual long-term occupation. These sites represent minimal investment in feature construction and often little patterning in site layout, but yield abundant artifacts, indicating long-term or repeated occupation. Group 3 sites comprise 21 percent of the sample. Lastly, the "Group 4" sites represent sites of anticipated short-term, actual short-term occupation. These sites evince little investment in construction labor and little patterning in site layout, and yield relatively few artifacts. Twenty-seven percent of the sites in the sample are classified Group 4 sites.

It is likely that sites representing different residential mobility categories will evidence variation in site setting. It might be expected, for example, that the sites with anticipated long-term occupation would tend to cluster in the lower elevations, where peoples might have spent winters. Anticipated short-term occupations, on the other hand, might display more variation, representing short-term forays into the lowest or highest elevations to extract seasonally available food resources. The database is too small and biased by the history of site selection for excavation to determine such trends at present, however. Such modeling will be important in the future.

The distribution of sites with evidence of corn or squash provides some insight into the distribution of lands suitable for prehistoric horticulture. Twelve sites with cultigens have been documented in the study area; elevations range from a low of 5,738 ft (1,749 m) at Tabeguache Cave II to 6,902 ft (2,104 m) at site 5OR243 near Ridgway Reservoir. The mean elevation of the sites with cultigens is 6,392 ft (1,948 m); the majority of the sites cluster around the mean. Overall, the data suggest that the elevation zone between approximately 5,700 and 7,000 ft (1,737 and 2,134 m) contained the farming belt during the Formative era on the Uncompahgre Plateau (Figure 11). Formative-era sites occur in all elevation zones outside the farming belt (Figure 12); sites in the highest or lowest settings are likely to represent either seasonal forays by farmers or by full-time foragers that occupied other portions of the study area.

Particularly Important Sites

Sites with residential architecture that date to the Formative era are particularly important cultural resources. As indicated in Table 33, there are only about 22 known sites with residential architecture, and many of these have been excavated by archaeologists many decades ago or have been otherwise disturbed.

Sites that yield evidence of cultigens are also particularly important. Sites with cultigens are currently uncommon in the project area, which is, in part, due to the small number of controlled excavations completed during the period of routine examination for macrobotanical remains. Thirteen sites have yielded corn and/squash; these are listed in Table 34. Important research questions that might be addressed with data from such sites include the relative importance of cultigens in site subsistence practices and the delineation of the period of farming.

Table 29. Summary of Formative-Era Component Attributes.

Variable	5DT2 Christmas Rockshelter Levels 5&6	5MN6 Frank's Shelter	5MN14 Carlyle Shelter	5MN17 Initial Site	5MN28 Shirley's Shelter	5MN30 Monte's Shelter	5MN34 Squint Site	5MN35 Bedrock Pit	5MN38 Childer's Site
Structure Labor	None	None	None	None	None	None	None	None	None
Pit Feature Labor	High	Low	Low	High	Low	Low	Low	High	--
Storage Feature Labor	Moderate	--	--	--	--	--	--	--	--
Mean Size FCR	--	--	--	--	--	--	--	--	--
Ceramic Labor	--	--	--	--	--	--	--	--	--
Exotic Ceramics	--	--	--	--	--	--	--	--	--
Debitage Density	285	--	--	--	--	--	--	--	--
Reduction Strategy	--	--	--	--	--	--	--	--	--
Expedient Tools	.61	.39	.39	.45	.53	.48	.38	.53	.57
FST Classes	8	8	6	7	7	7	8	7	7
Tool Diversity Index	3,104	248	768	770	378	231	1336	406	805
Ornaments	--	--	--	--	--	--	--	--	--
Milling Technology Labor	Low	Low	Low	Low	Low	--	Low	Low	Low
Bone Grease Production	--	--	--	--	--	--	--	--	--
Fauna Diversity	--	--	--	--	--	--	--	--	--
Floral Food Diversity	--	--	--	--	--	--	--	--	--
Fuel Wood Diversity	--	--	--	--	--	--	--	--	--
Site Cleaning	--	--	--	--	--	--	--	--	--
Shelter Quality	High	High	High	Moderate	High	High	Moderate	Moderate	Moderate
Mobility Group	**1**	**3**	**3**	**1**	**3**	**3**	**3**	**1**	**1**

Key:
FCR = fire-cracked rock
FST = flaked-stone tool

Table 30. Summary of Formative-Era Component Attributes.

Variable	5MN40 Shavano Spring Levels 3&4	5MN55 Roubideau Rim, Level 2	5MN57 Frank Bond's Site	5MN368 Weimer IV	5MN654 Cottonwood Pueblo	5MN653 Wagon Bend	5MN868 Tabeguache Cave	5MN890 Tabeguache Cave II	5MN1609 Tabeguache Pueblo
Structure Labor	None	None	None	High	High	High	High	None	High
Pit Feature Labor	High	--	High	Low	Low	Low	--	High	--
Storage Feature Labor	Moderate	--	--	--	--	Moderate	Moderate	Moderate	--
Mean Size FCR	--	--	--	--	--	--	--	--	--
Ceramic Labor	--	Low	--	High	High	High	--	--	High
Exotic Ceramics	--	--	--	Present	Present	Present	--	--	Present
Debitage Density	16.4	74.4	204.1	High	--	32	--	--	--
Reduction Strategy	--	--	--	--	--	--	--	--	--
Expedient Tools	.42	.68	.62	--	--	--	--	--	--
FST Classes	7	7	6	6	6	5	5	4	5
Tool Diversity Index	462	749	1026	--	--	--	--	--	--
Ornaments	--	--	--	--	Present	--	Present	--	Present
Milling Technology Labor	Low	Low	Low	Low	Low	Low	Low	Low	Low
Bone Grease Production	--	--	--	--	--	--	--	--	--
Fauna Diversity	--	--	--	--	--	--	--	--	--
Floral Food Diversity	--	--	--	3	--	2	8	--	--
Fuel Wood Diversity	--	--	--	--	--	--	--	--	--
Site Cleaning	--	--	--	--	--	--	--	--	--
Shelter Quality	Low	Moderate	Low	High	High	High	High	High	High
Mobility Group	**1**	**3**	**1**	**1**	**1**	**1**	**1**	**2**	**1**

Key:
FCR = fire-cracked rock
FST = flaked-stone tool

Table 31. Summary of Formative-Era Component Attributes.

Variable	5MN2628 Oak Hill Comp. 1	5MN3760	5MN3876 Transfer Road Hamlet	5MN4082	5MN4253 Schmidt Loc2Com1	5MN4253 Schmidt Loc2Com2	5MN4253 Schmidt Loc2Com3	5MN4253 Schmidt Loc3Com1
Structure Labor	--	None	Medium	None	None	--	--	Medium
Pit Feature Labor	High	High	Low	Low	High	High	Low	Low
Storage Feature Labor	--	--	Moderate	--	--	--	--	--
Mean Size FCR	0.85	--	0.2 kg	0.09 kg	1.7 kg	0.16 kg	--	0.17 kg
Ceramic Labor	--	--	--	--	--	--	--	--
Exotic Ceramics	--	--	--	--	--	--	--	--
Debitage Density	1.7	21.5	69.3	14.2	23.9	2.3	13.0	5.0
Reduction Strategy	--	--	Flake	Both	Biface	Biface	Both	Biface
Expedient Tools	.11	.50	.48	.38	.47	.33	.29	.30
FST Classes	4	1	6	5 (High)	High	High	High	Low
Tool Diversity Index	45	4	1050	130	306	72	120	72
Ornaments	--	--	--	--	--	Yes	--	Yes
Milling Technology Labor	Low	Low	Low	Low	Low	Low	--	Low
Bone Grease Production	No	--	No	No	Possible	Possible	No	No
Fauna Diversity	Low	--	Low	Low	Low	Low	Low	Low
Floral Food Diversity	1	1	Low	Low	Low	Low	Low	High
Fuel Wood Diversity	Low	Low (1)	Low	Low	Low	Low	Low	Low
Site Cleaning	--	--	Some	--	--	--	--	--
Shelter Quality	Low	Low	High	Low	Low	Low	Low	High
Mobility Group	**2**	**2**	**1**	**4**	**3**	**4**	**4**	**2**

Key:
FCR = fire-cracked rock
FST = flaked-stone tool

Table 32. Summary of Formative-Era Component Attributes.

Variable	5OR179	5OR182	5OR198	5OR243	5OR317	5SM2425 Simpson Wickiup Comp. 3	5SM2578 Fallen Deer
Structure Labor	None	None	None	None	None	None	None
Pit Feature Labor	Low	Low	Low	Low	Low	High	--
Storage Feature Labor	--	--	--	--	--	--	--
Mean Size FCR	--	--	--	--	--	0.2 kg	--
Ceramic Labor	--	--	--	--	--	--	High
Exotic Ceramics	--	--	--	--	--	--	Present
Debitage Density	12.2	48.1	8.8	19.4	3.3	1.1	12.8
Reduction Strategy	--	--	--	--	--	Both	Biface
Expedient Tools	.55	.73	.83	.64	.57	.31	.33
FST Classes	4	4	3	3	4	High	3
Tool Diversity Index	80	104	18	42	28	210	45
Ornaments	--	Present	--	--	--	--	--
Milling Technology Labor	Low	Low	Low	Low	Low	Low	--
Bone Grease Production	--	--	--	--	--	No	--
Fauna Diversity	--	--	--	--	--	High	Low
Floral Food Diversity	--	--	--	--	--	Low	--
Fuel Wood Diversity	--	--	--	--	--	Low	--
Site Cleaning	--	--	--	--	--	--	--
Shelter Quality	Low	Low	Low	Low	Low	Low	Low
Mobility Group	**4**	**4**	**4**	**4**	**4**	**2**	**4**

Key:
FCR = fire-cracked rock
FST = flaked-stone tool

Figure 11. Distribution of sites with cultigens.

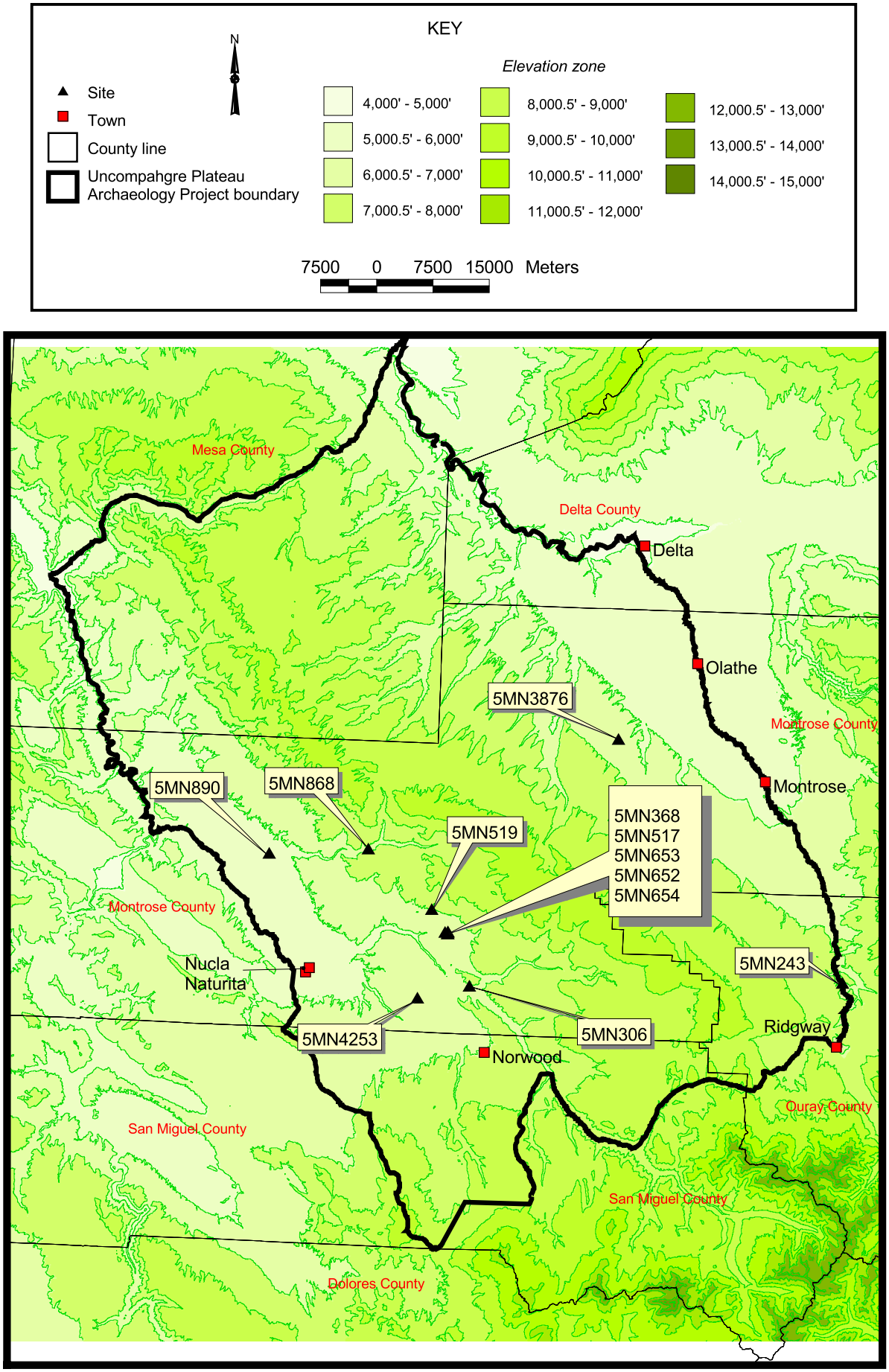


Figure 11. Distribution of sites with cultigens.

Figure 12. Distribution of Formative-era sites in the UPAP study area.

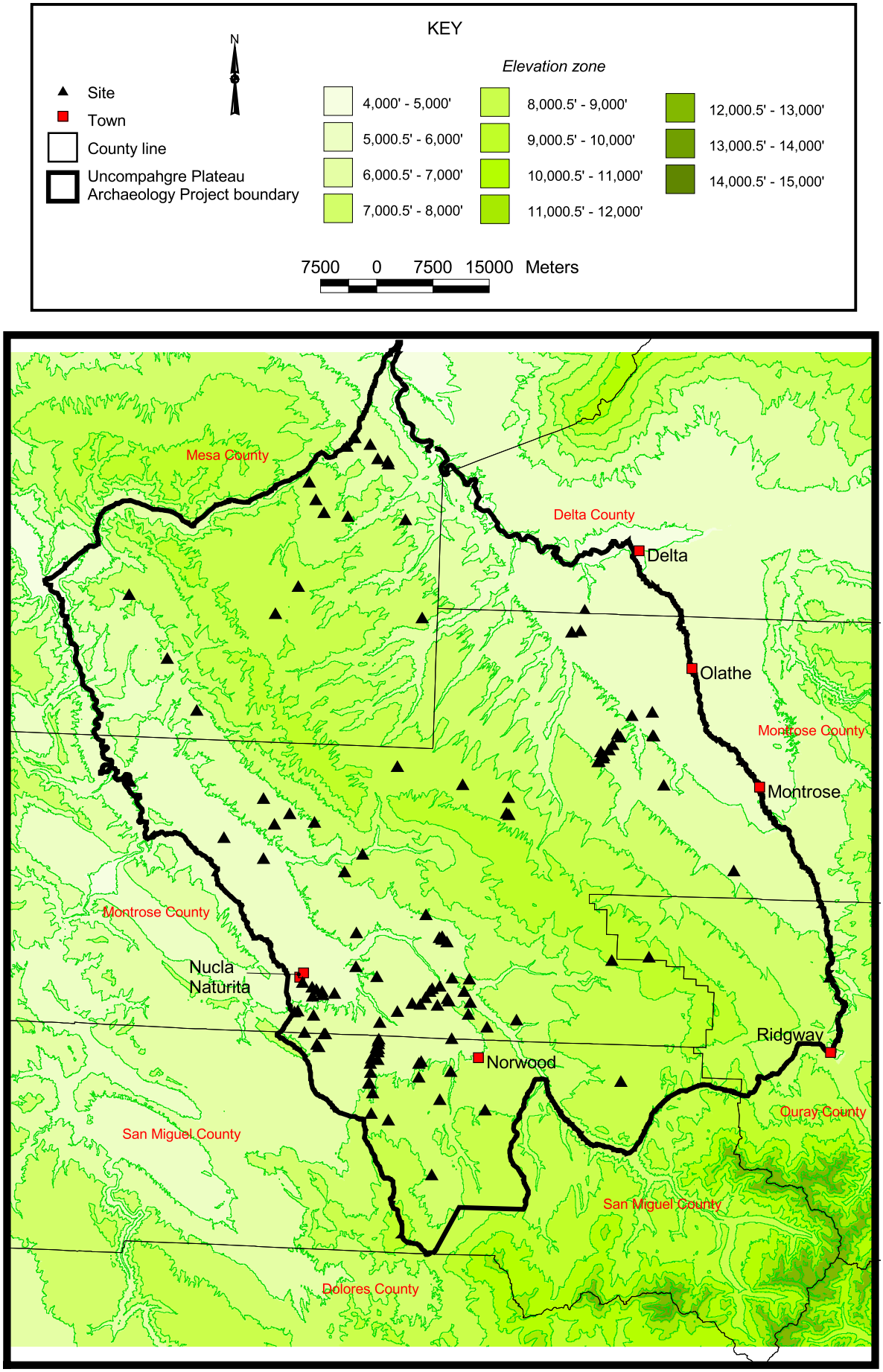


Figure 12. Distribution of Formative-era sites in the UPAP study area.

Table 33. Formative-Era Site Types in the UPAP Study Area.

Site Type	Count	Percentage
Lithic Procurement	1	0.8%
Open Architectural	17	14.0%
Open Artifact Scatter	85	70.2%
Open Artifact Scatter; Cambium Tree	1	0.8%
Rock Art	1	0.8%
Sheltered Architectural	2	1.7%
Sheltered Architectural; Rock Art	3	2.5%
Sheltered Artifact Scatter	8	6.6%
Sheltered Artifact Scatter; Rock Art	3	2.5%
Total	**121**	**100.0%**

Table 34. Sites in the UPAP Study Area with Cultigens.

Site Number	Site Name	Cultigen(s)	Reference
5MN306	--	Corn	Gleichman 1982
5MN368	Weimer Ranch IV	Corn	Crane 1977
5MN517	Hill I, Weimer Ranch	Corn	Crane 1977
5MN519	Cottonwood Cave	Corn	Hurst 1948a; Stiger and Larson 1992
5MN652	Middle Hill	Corn	Crane 1977
5MN653	Wagon Bend, Weimer Ranch	Corn	Crane 1977
5MN654	Cottonwood Pueblo	Corn	Crane 1977
5MN868	Tabeguache Cave	Corn, Squash	Hurst 1940, 1941
5MN890	Tabeguache Cave II	Corn, Squash	Hurst 1943, 1944
5MN3876	Transfer Road Hamlet	Corn	Kalasz et al. 2001
5MN4253	Schmidt Site	Corn	Greubel and Cater 2001
5OR243	--	Squash or Gourd	Muceus and Lawrence 1986

Chapter 7
Protohistoric Era: Context and Research Design

Introduction

Following Reed and Metcalf (1999:146), the Protohistoric era refers to aboriginal occupation of western Colorado between the end of horticultural-based subsistence practices of the Formative era and the final expulsion of the Ute to reservations in A.D. 1881. Formative-era horticultural adaptations had essentially terminated by A.D. 1300 or so, and subsistence was once again focused solely on hunting and gathering. By the time of the first historic documentation of the region's aboriginal groups in 1776, when Fathers Escalante and Dominguez skirted the southern and eastern edge of the Uncompahgre Plateau on their planned expedition to California (Warner 1995), Ute were identified in the area. The Ute remained the primary aboriginal occupants of west-central Colorado throughout the historic period. Because the Ute have so long been associated with the region, and because ceramic and projectile point types from Ute sites of the historic period extend into prehistory, the Ute or their ancestors are commonly inferred to have been the primary inhabitants of the area throughout the era (Reed 1994).

Protohistoric sites in the UPAP study area primarily consist of open lithic scatters, though rockshelters were occasionally occupied, as well. Diagnostic artifacts include Desert Side-notched and Cottonwood Triangular projectile points and, better still, Uncompahgre Brown Ware ceramics. Habitation architecture consists of rather insubstantial brush structures, called wickiups. Relatively few wickiups remain in the area because of their insubstantial nature and vulnerability to forest fires.

Dated and Excavated Protohistoric Sites on the Uncompahgre Plateau

Excavation beyond simple testing or feature recovery has been conducted at 15 sites within the UPAP study area. These sites are briefly discussed below. When one considers that nearly 50 Formative-era components have been excavated in the study area, it is evident that the excavation database for the Protohistoric era is meager.

McMillen Site (5MN13)

The McMillen site, located northwest of Montrose, was minimally investigated by the Ute Prehistory Project (Buckles 1971). Excavations established that site soils were shallow and that artifacts and features were restricted to the surface and the uppermost few centimeters of soil. Lithic, ceramic, metal, and glass artifacts were recovered. Lithic artifacts include projectile points, knives, scrapers, and similar items. Projectile point types include Cottonwood Triangular and Rosegate series. Small side-notched points were reportedly collected at the site by amateurs. The ceramics were classified as Uncompahgre Brown Ware, a type commonly attributed to the Ute. Historic artifacts from the site included a brass pendant, a tin dangle pendant, and a perforated Sharps .50-66 cartridge, possibly modified for use as an ornament. Several cut pieces of metal were also found, as were glass trade beads. No chronometric dates were obtained, though unlined fire pits were discovered. Buckles (1971) attributed the site to the Escalante phase, his most recent archaeological unit in the Uncompahgre complex sequence.

Carlyle Shelter (5MN14)

Carlyle Shelter is northwest of Montrose, Colorado and was investigated as part of the Ute Prehistory Project (Buckles 1971). Protohistoric occupation of Carlyle Shelter is suggested by a Desert Side-notched projectile point from Level 4. Other projectile point types – most similar to the Rosegate series – are also present and are superimposed over Level 4. Because the Rosegate series points are probably older than the Desert Side-notched type, the site's Protohistoric component is tenuous. No chronometric dates were obtained at the site.

5MN18

Site 5MN18 is a rockshelter west of Montrose, Colorado. The site was minimally investigated by the Ute Prehistory Project; it was selected because Uncompahgre Brown Ware sherds were found on the slope below the rockshelter (Buckles 1971). Excavations in the rockshelter yielded only two artifacts, neither of which was ceramic nor diagnostic. Two unlined fire pits were found in the shallow site soils, but neither was chronometrically dated.

Bedrock Pit Site (5MN35)

The Bedrock Pit site is northwest of Montrose on the eastern side of Dry Creek. It was excavated as part of the Ute Prehistory Project (Buckles 1971). Protohistoric occupation of the site is tenuous, consisting of a steel knife blade and a shell button. Other artifacts at the site are clearly aboriginal, and most of are indicative of a Formative-era occupation. Buckles (1971) infers that the metal and shell artifacts were associated with American Indians because the site's location was incompatible with Euroamerican settlement patterns in the area. Because the site's primary occupation precedes the Protohistoric era, the site contributes little to our understanding of that unit.

Shavano Spring Site (5MN40)

The Shavano Spring site is in the Shavano Valley west of Montrose and was investigated as part of the Ute Prehistory Project (Buckles 1971). Two excavation blocks were established; the southernmost, Excavation Unit 2, yielded evidence of a Protohistoric occupation. The surface (Level 1) is attributed by Buckles to the Escalante phase, his most recent aboriginal phase. A large number of stone artifacts were found on the surface, including Cottonwood Triangular and a small side-notched point. Two glass trade beads were also found. The underlying Level 2 yielded Desert Side-notched and small corner-notched projectile points, as well as numerous flakes and ground or chipped stone tools. The presence of small corner-notched projectile points suggested to Buckles that Escalante phase deposits were mixed with slightly older Camel Back phase deposits, the latter of which might represent a Formative-era occupation. No cultural features were reported in the Protohistoric deposits, and no chronometric dates were obtained for those deposits.

Lee Ranch Wickiup (5MN41)

The Lee Ranch Wickiup site is west of Montrose on Monitor Mesa and was investigated as part of the Ute Prehistory Project (Buckles 1971). Buckles estimated that 15 wickiups were present at the site; most were in a single cluster, but two were isolated from the rest. The isolated wickiups were thought to possibly represent menstrual huts (Buckles 1971). The site had been collected and considerably impacted prior to Buckles's investigation. Eight wickiups were excavated, including the two possible menstrual huts. Interior central fire pits were found in all, though the features in the two possible menstrual huts were small and relatively informal. Few artifacts were found in any of the wickiups. Recovered artifacts included a few flakes and two Uncompahgre Brown Ware sherds. Buckles (1971) reported that others had previously collected two projectile points from the site that probably resemble Desert Side-notched points. Architectural data on the structures were recorded. Beams were collected for dendrochronological analysis. One specimen (UTE 2) was dated to A.D. 1741, more than a century earlier than expected by Buckles (1971). The early date probably reflects use of long-dead wood by the site occupants.

5MN42

Site 5MN42, also on Monitor Mesa west of Montrose, was investigated during the Ute Prehistory Project. Two wickiups were documented at the site (Buckles 1971). One fire pit was encountered during the excavation of the two structures. Juniper bark was found on structure floors. Artifacts were sparse, but included a stone scraper and a fragment of a brass knife blade.

Dendrochronological samples from the site dated to A.D. 163 (UTE 4) and A.D. 1762 (UTE 5) (Buckles 1985). These dates may be too old, if old wood was used in construction.

Monitor Creek Wickiup (5MN44)

The Monitor Creek Wickiup site west of Montrose was investigated by the Ute Prehistory Project. A single wickiup was found at the site. An unlined fire pit was found inside the structure, but no artifacts were recovered (Buckles 1971). Excavations appear to have focused only on the structure.

5MN65

Site 5MN65 is a single wickiup on Monitor Mesa west of Montrose. When investigated by the Ute Prehistory Project, the site had been badly damaged by looters. It probably once had a central hearth (Buckles 1971). No artifacts were recovered, and no chronometric dates were obtained.

Harris Site (5MN2341)

The Harris site was investigated by the Chipeta Chapter of the Colorado Archaeological Society in 1987-1988 (Tucker and CAS 1989). The site, northwest of Montrose on the lower flanks of the Uncompahgre Plateau, is a rockshelter. Three excavation units were dug near the rockshelter; these yielded Archaic and Formative-era deposits. Across the stream from the rockshelter, in the valley bottom, several surface artifact concentrations were investigated. One concentration yielded five metal cans, a metal spoon, a rifle cartridge, part of a nineteenth-century Spanish ring spade bit, and 12 glass seed beads. The rifle cartridge was stamped with a date of 1879, and the beads were of styles manufactured between 1840 and 1910. The concentration was attributed to a late Ute occupation. No excavations were conducted in the concentration.

Oak Hill Site (5MN2628)

The Oak Hill site is southwest of Montrose on the rim of Roubideau Canyon. The large site was investigated as part of the TransColorado Pipeline Project. Evidence of Protohistoric occupation consists of a peeled ponderosa pine tree, Cottonwood Triangular and Desert Side-notched projectile points, and a gray ceramic sherd that was dated by thermoluminescence to the period A.D. 1456-1562. No pit features were attributed to the Protohistoric component, and the artifact sample was small. The component was interpreted as a short-term campsite (Cater 2001).

5MN3861

Site 5MN3861, west of Dry Creek and west of Montrose, was minimally investigated by the TransColorado Pipeline Project. Two Uncompahgre Brown Ware sherds were collected at the site during the survey phase. Excavations yielded a Cottonwood Triangular projectile point (Slessman and Davis 2001). No cultural features or discrete loci of Protohistoric activities were discerned.

Schmidt Site (5MN4253)

The Schmidt site is a very large open artifact scatter northwest of Norwood, Colorado. Extensive archaeological excavations were conducted at the site during the TransColorado Pipeline Project. Seven loci, representing clusters of surface artifacts, were defined when the site was recorded. Archaeological data recovery focused on Loci 1, 2, 3, and 6 (Greubel and Cater 2001). Components attributable to the Protohistoric-era Ute were identified in Loci 1, 2, and 6. A collapsed wickiup and its surrounding area were investigated in Locus 1. A hearth was found within the collapsed structure. Radiocarbon data suggest an occupation between A.D. 1700 and the late 1800s. No Euroamerican artifacts were recovered. Lithic artifacts were recovered, including Desert Side-

notched projectile points. Like the other loci with Protohistoric components at the site, a variety of ancillary study samples was collected and processed.

A total of 408 m² was excavated at Locus 2. Abundant pit features, nearly 24,000 stone artifacts, and a collapsed wickiup were found at Locus 2. Four components were identified, including one (Component 4) that dated to the Protohistoric era (Greubel and Cater 2001). Radiocarbon and dendrochronological data suggest two occupations, one between A.D. 1450 and 1680 and the other in the early eighteenth century. Artifacts from the component include Desert Side-notched and Cottonwood Triangular projectile points and 22 Uncompahgre Brown Ware sherds.

A block encompassing 63 m² was excavated at Locus 6 to expose a collapsed wickiup. Excavations there yielded the remains of a small brush structure with an interior hearth, an extramural hearth, and a sample of lithic artifacts. Diagnostic artifacts consisted of Desert Side-notched projectile points. Thermoluminescence, radiocarbon, and dendrochronological dating samples were processed. These data suggest a site occupation at approximately A.D. 1838.

Aldasoro Site (5MN4270)

The Aldasoro site is a sherd and lithic scatter investigated on the TransColorado Pipeline Project northwest of Norwood, Colorado. Two excavation blocks were dug; Block 1, comprising 33 m², yielded evidence of a Protohistoric component (Greubel and Reed 2001a). Block 1 excavations yielded 533 sherds, dominated by a brown ware variety with partly obliterated corrugations. A thermoluminescence date from one of the sherds indicates manufacture sometime between A.D. 1461 and 1545. Lithic artifacts were also recovered. One pit feature was excavated that yielded a radiocarbon date of cal A.D. 1305-1430. The discrepancy between the thermoluminescence and radiocarbon dates is attributed to use of old wood as fuel in the hearth.

Simpson Wickiup Site (5SM2425)

The Simpson Wickiup site is west of Norwood, Colorado, on the rim of Hamilton Canyon. The site was excavated as part of the TransColorado Pipeline Project. Seven excavation blocks were defined, with Block 1 encompassing two wickiups (Greubel 2001). Five components were identified; Components 4 and 5 were attributed to the Protohistoric or Historic Ute. Relatively broad areas were exposed by excavation, permitting the recovery of many artifacts and ancillary study samples and the exposure of many features.

Component 4 included a collapsed wickiup with both interior and exterior hearths. Radiocarbon and other ancillary study specimens were collected and processed. Artifacts were dominated by lithic artifacts, but one brass or copper artifact was also recovered. Diagnostic artifacts include Desert Side-notched projectile points and 170 Dinetah Gray sherds. Dinetah Gray is an early Navajo ceramic type, often found just south of the Colorado/New Mexico border. The component is, however, attributed to the Ute, based on a preponderance of other data. Component 4 is thought to date to the late seventeenth century.

Component 5 yielded Desert Side-notched projectile points, iron cone tinklers, worked wood, a ceramic pipe (?) fragment, a percussion cap, and various lithic artifacts. Cultural features attributed to Component 5 include a standing wickiup and several hearths and roasting pits. Temporally sensitive artifacts indicate an occupation during the late eighteenth or early nineteenth centuries.

Quality of the Database

A total of 163 sites in the UPAP study area are attributed to the Protohistoric era (Figure 1). Most are open lithic scatters, though some also yield small quantities of brown ware ceramics. Thirty-three of the sites have wickiups (Table 35). One possible sweat lodge (5MN5700) has also been identified in the study area; its age and cultural affiliation are unknown.

Figure 13. Distribution of Protohistoric components in the study area.

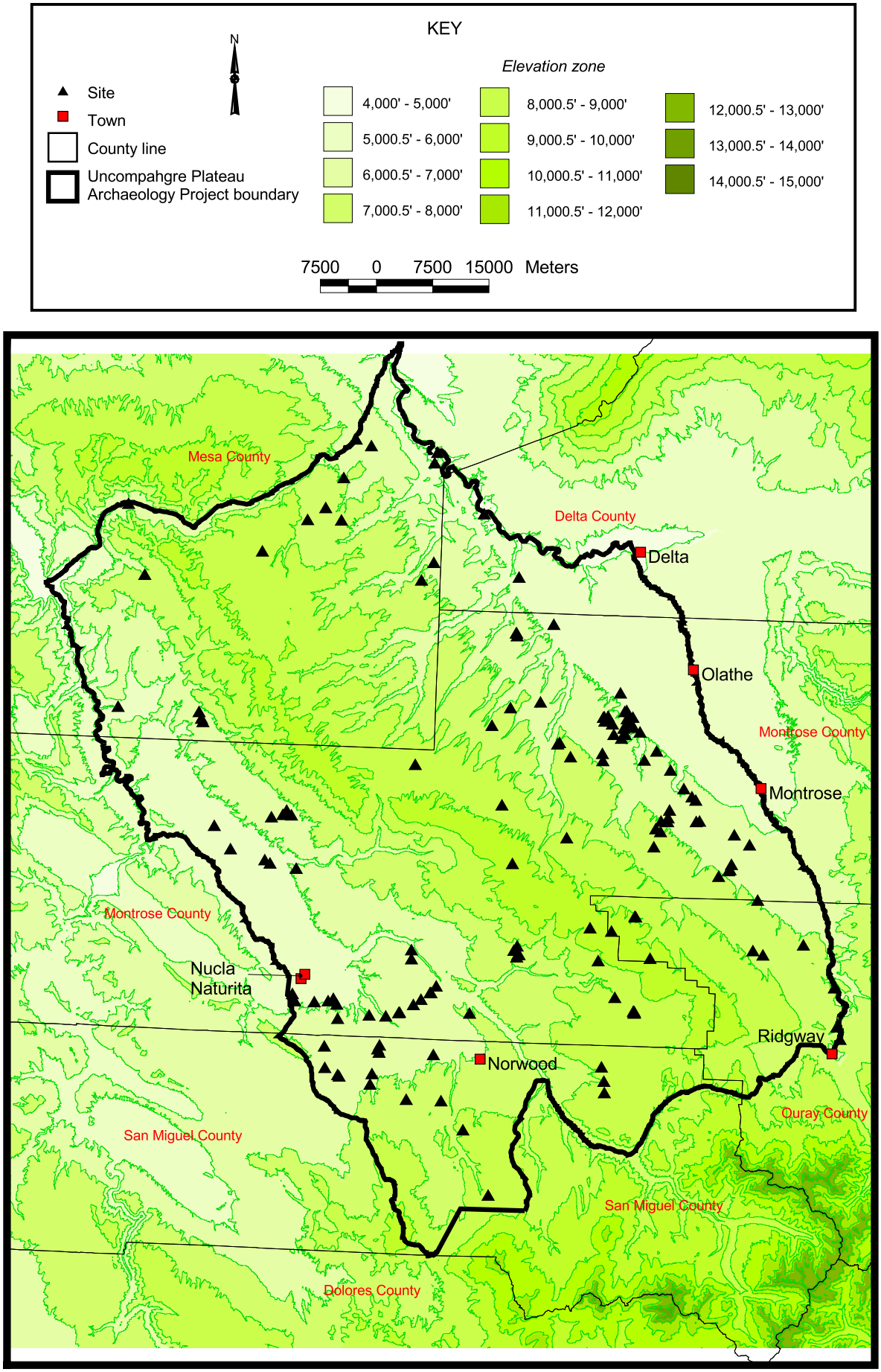


Figure 13. Distribution of Protohistoric components in the study area.

Table 35. Sites with Wickiups in the Study Area.

Site Number	Reference
5ME346	Sanfilippo 1998
5ME469	Office of Archaeology and Historic Preservation Database
5ME552	Office of Archaeology and Historic Preservation Database
5ME5693	Sanfilippo 1998
5ME6793	Office of Archaeology and Historic Preservation Database
5ME7378	Office of Archaeology and Historic Preservation Database
5ME12290	Office of Archaeology and Historic Preservation Database
5MN41	Office of Archaeology and Historic Preservation Database
5MN42	Office of Archaeology and Historic Preservation Database
5MN44	Office of Archaeology and Historic Preservation Database
5MN65	Office of Archaeology and Historic Preservation Database
5MN475	Office of Archaeology and Historic Preservation Database
5MN813	Sanfilippo 1998
5MN861	Office of Archaeology and Historic Preservation Database
5MN1519	Office of Archaeology and Historic Preservation Database
5MN2629	Office of Archaeology and Historic Preservation Database
5MN3082	Office of Archaeology and Historic Preservation Database
5MN3110	Sanfilippo 1998
5MN3485	Office of Archaeology and Historic Preservation Database
5MN3612	Office of Archaeology and Historic Preservation Database
5MN4253	Office of Archaeology and Historic Preservation Database
5MN4305	Office of Archaeology and Historic Preservation Database
5MN4349	Office of Archaeology and Historic Preservation Database
5MN4498	Office of Archaeology and Historic Preservation Database
5MN4499	Office of Archaeology and Historic Preservation Database
5MN4680	Office of Archaeology and Historic Preservation Database
5MN4903	Office of Archaeology and Historic Preservation Database
5OR841	Sanfilippo 1998
5SM1126	Office of Archaeology and Historic Preservation Database
5SM2406	Office of Archaeology and Historic Preservation Database
5SM2425	Office of Archaeology and Historic Preservation Database
5SM2427	Office of Archaeology and Historic Preservation Database
5SM4348	McGuire 2003

As with other archaeological units, the quality of the Protohistoric database varies considerably, reflecting the periods in which the sites were investigated. The earliest archaeological investigations in the region focused on Formative or Archaic sites, so the nature of the region's Protohistoric-era occupation remained largely unknown. Considerable gains in our understanding of Protohistoric-era archaeology were made by the Ute Prehistory Project in the early 1960s. William Buckles (1971) and his associates excavated nine sites with clear Protohistoric components. Although excellent data regarding artifact types were obtained, chronometric dating was limited to dendrochronological analysis of a three wickiups from sites 5MN41 and 5MN42 (Buckles 1985). Important information regarding animal bones was lost, and macrobotanical, palynological, and similar modern ancillary analyses were not conducted. The sites where Buckles encountered Protohistoric components tended to be minimally excavated, as described above. Excavations at wickiup sites, for example, focused on feature interiors, with little consideration of extramural activity areas.

As would be expected, the most recent investigations tend to produce the quality of data that best conform to current expectations. Two of the recently investigated sites, the Schmidt site (5MN4253) and the Simpson Wickiup site (5SM2425) yielded abundant archaeological data. Because these two sites had standing or collapsed but discernible wickiups, as well as numerous pit

features and artifacts, these two sites were extensively investigated. The excavation of large blocks at these two sites permitted analysis of site structure and better discernment of the association of site materials. Specimens for radiocarbon, macrobotanical, archaeofaunal, palynological, and thermoluminescence dating were liberally collected and processed. These two sites have contributed greatly to our understanding of the region's Protohistoric archaeology.

Modeling the Protohistoric Era

Chronology

Twenty-five Protohistoric-era radiocarbon dates have been obtained within the UPAP study area. These dates represent only six sites, however, with the large majority from either the Schmidt or the Simpson Wickiup sites (Table 36). Although our understanding of the chronology of the Schmidt and Simpson Wickiup sites is thorough, our understanding of Protohistoric-era occupation of the overall study area is quite limited. When viewed uncritically, the data suggest occupation of the study era by Protohistoric-era groups between cal A.D. 1300 and the late nineteenth century.

A considerable number of dendrochronological dates have also been obtained in the project area that relate to the Protohistoric era (Table 38). Buckles (1985) obtained two tree-ring dates from structural elements at the Lee Ranch Wickiup site (5MN41) and one from a wickiup at 5MN42. These dated between A.D. 1741 and 1763. Twelve Protohistoric-era dendrochronological dates were obtained at the Schmidt site (5MN4253), from three loci. Seventeenth, eighteenth, and early nineteenth century dates were obtained (Table 37). Six of the tree-ring samples consisted of poles from wickiups, and six were from juniper trees stripped of their bark. The stripped trees probably represent sources for bedding and wickiup closing material, and so also provide an indication of the period of site use (Greubel and Cater 2001). The samples derived from wickiup poles yielded seventeenth century dates, whereas the stripped tree samples evinced more variation. The Simpson Wickiup site (5SM2425) also yielded 12 Protohistoric-era tree-ring dates (Greubel 2001). There, the dates ranged from the fifteenth through the nineteenth centuries. At that site, the samples from the wickiup poles were not among the oldest dates.

Five acceptable Protohistoric-era dates within the study area have also been obtained through thermoluminescence dating of ceramic sherds. Three thermoluminescence dates were obtained from two of the Protohistoric components at the Schmidt site. These indicated component occupations at approximately A.D. 1750 and at approximately A.D. 1400 (Greubel and Cater 2001). A corrugated brown ware sherd from the Aldasoro site (5MN4270) yielded a date of approximately A.D. 1500, and a Dinetah Gray sherd from the Simpson Wickiup site yielded a date of approximately A.D. 1620.

Accurate dating of Protohistoric-era components is especially critical because important research topics, such as the timing of Numic immigration into the region and the identification of periods of depopulation related to the introduction of European diseases, require high-quality data. Dendrochronological dating of wickiup poles and radiocarbon dating of hearth fuel woods have generally provided the basis for chronological interpretations over the past few decades. These methods, however, are being shown to be too imprecise to permit adequate analyses of important research questions (Reed et al. 2001). The primary limitations of the traditional dating approaches stem from use of long-dead wood for fuel and for habitation structures. As Reed et al. (2001) argue, based on ethnographic and archaeological evidence, regional Protohistoric-era peoples lacked an effective technology for cutting large pieces of wood. The Utes had bone wedges and chopping tools that could cut wood (Smith 1974), but such tools required great amounts of labor to topple living trees (see also Mills 1993). Because Protohistoric populations were highly mobile and had low demand for large beams, they probably simply toppled long-dead standing trees when needed. They may have even purposefully killed living trees for future use (Greubel and Cater 2001). Pinyon and

Table 36. Protohistoric-Era Radiocarbon Dates.

Site	Site Name	Sample No.	Radio-carbon Assay B.P.	Calibrated Range (2 sigma)	Dated Material	13C/12 C Ratio	Reference	Comments
5MN4253	Schmidt Site	Beta-117459	650 ± 60	A.D. 1270-1410	Charcoal	-25 o/oo	Greubel and Cater 2001	Locus 1
5MN4253	Schmidt Site	Beta-117460	300 ± 60	A.D. 1450-1800	Charcoal	-25 o/oo	Greubel and Cater 2001	Locus 1
5MN4253	Schmidt Site	Beta-117461	400 ± 50	A.D. 1430-1630	Charcoal	-25 o/oo	Greubel and Cater 2001	Locus 1
5MN4253	Schmidt Site	Beta-117127	650 ± 50	A.D. 1280-1400	Charcoal	-25 o/oo	Greubel and Cater 2001	Locus 2, Component 4
5MN4253	Schmidt Site	Beta-117120	560 ± 50	A.D. 1300-1430	Charcoal	-25 o/oo	Greubel and Cater 2001	Locus 2, Component 4
5MN4253	Schmidt Site	Beta-117124	450 ± 50	A.D. 1400-1625	Charcoal	-25 o/oo	Greubel and Cater 2001	Locus 2, Component 4
5MN4253	Schmidt Site	Beta-117121	330 ± 50	A.D. 1460-1650	Charcoal	-25 o/oo	Greubel and Cater 2001	Locus 2, Component 4
5MN4253	Schmidt Site	Beta-127856	300 ± 70	A.D. 1440-1945	Bone collagen	-19. o/oo	Greubel and Cater 2001	Locus 2, Component 4
5MN4253	Schmidt Site	Beta-117471	650 ± 50	A.D. 1280-1400	Charcoal	-25 o/oo	Greubel and Cater 2001	Locus 6, Component 1
5MN4270	Aldasoro Site	Beta-117117	560 ± 40	A.D. 1300-1430	Charcoal	-21.4 o/oo	Greubel and Reed 2001a	
5SM2425	Simpson Wickiup	Beta-127183	1070 ± 50	A.D. 790-1150	Charcoal	-25 o/oo	Greubel 2001	Component 4
5SM2425	Simpson Wickiup	Beta-127193	530 ± 60	A.D. 1300-1450	Charcoal	-25 o/oo	Greubel 2001	Component 4
5SM2425	Simpson Wickiup	Beta-127188	520 ± 50	A.D. 1300-1460	Charcoal	-25 o/oo	Greubel 2001	Component 4
5SM2425	Simpson Wickiup	Beta-127186	490 ± 60	A.D. 1300-1620	Charcoal	-25 o/oo	Greubel 2001	Component 4
5SM2425	Simpson Wickiup	Beta-127182	460 ± 60	A.D. 1320-1630	Charcoal	-25 o/oo	Greubel 2001	Component 4
5SM2425	Simpson Wickiup	Beta-127196	440 ± 70	A.D. 1340-1640	Sediment	-25 o/oo	Greubel 2001	Component 4
5SM2425	Simpson Wickiup	Beta-127189	450 ± 50	A.D. 1400-1625	Charcoal	-25 o/oo	Greubel 2001	Component 4
5SM2425	Simpson Wickiup	Beta-127191	190 ± 60	A.D. 1640-1950	Charcoal	-25 o/oo	Greubel 2001	Component 5
5SM2425	Simpson Wickiup	Beta-127185	140 ± 70	A.D. 1660-1940	Wood	-25 o/oo	Greubel 2001	Component 5
5SM2425	Simpson Wickiup	Beta-127187	80 ± 60	A.D. 1680-1950	Charcoal	-25 o/oo	Greubel 2001	Component 5
5SM2425	Simpson Wickiup	Beta-127184	80 ± 60	A.D. 1675-1950	Charcoal	-25 o/oo	Greubel 2001	Component 5
5SM2427		Beta-131027	60 ± 60	A.D. 1670-1955	Sediment	-25 o/oo	Eckman et al. 2001	Feature 1000
5MN4253	Schmidt Site	Beta-130992	120 ± 50	A.D. 1670-1940	Charcoal	-25 o/oo	Eckman et al. 2001	Feature 1005
5MN2629		Beta-36043	810 ± 90	A.D. 1025-1390	Charcoal	?	Greubel 1989	
5OR182		Beta-1971	510 ± 60	A.D. 1310-1480	Charcoal	?	Muceus & Lawrence 1986	Too late?

Table 37. Dendrochronological Dates from Protohistoric-Era Sites.

Site No.	Site Name	Component	Sample No.	Outer Ring	Context
5MN41	Lee Ranch Wickiup		UTE-2	A.D. 1741	Wickiup
5MN42			UTE-5	A.D. 1762++v	Wickiup
5MN42			UTE-4	A.D. 1763v	Wickiup
5MN4253	Schmidt Site	Locus 1	Ute 17	A.D. 1613vv	Wickiup
5MN4253	Schmidt Site	Locus 1	Ute 20	A.D. 1646++vv	Wickiup
5MN4253	Schmidt Site	Locus 1	Ute 11	A.D. 1703++vv	Wickiup
5MN4253	Schmidt Site	Locus 2	Ute 40	A.D. 1725++vv	Stripped Tree
5MN4253	Schmidt Site	Locus 2	Ute 41	A.D. 1644++vv	Stripped Tree
5MN4253	Schmidt Site	Locus 2	Ute 42	A.D. 1708++vv	Stripped Tree
5MN4253	Schmidt Site	Locus 6	Ute 32	A.D. 1621vv	Wickiup
5MN4253	Schmidt Site	Locus 6	Ute 30	A.D. 1664++vv	Wickiup
5MN4253	Schmidt Site	Locus 6	Ute 33	A.D. 1617vv	Wickiup
5MN4253	Schmidt Site	Locus 6	Ute 26	A.D. 1811++vv	Stripped Tree
5MN4253	Schmidt Site	Locus 6	Ute 29	A.D. 1838++b	Stripped Tree
5MN4253	Schmidt Site	Locus 6	Ute 23	A.D. 1806++b	Stripped Tree
5SM2425	Simpson Wickiup		UTE 54	A.D. 1805++b	Stripped Tree
5SM2425	Simpson Wickiup		UTE 55	A.D. 1741++vv	Stripped Tree
5SM2425	Simpson Wickiup		UTE 56	A.D. 1735+vv	Stripped Tree
5SM2425	Simpson Wickiup		UTE 57	A.D. 1716+vv	Stripped Tree
5SM2425	Simpson Wickiup		UTE 58	A.D. 1761++vv	Stripped Tree
5SM2425	Simpson Wickiup		UTE 61	A.D. 1855++vv	Stripped Tree
5SM2425	Simpson Wickiup		UTE 62	A.D. 1679++b	Stripped Tree
5SM2425	Simpson Wickiup		UTE 63	A.D. 1486++vv	Stripped Tree
5SM2425	Simpson Wickiup		UTE 64	A.D. 1662++b	Stripped Tree
5SM2425	Simpson Wickiup		UTE 65	A.D. 1576++vv	Stripped Tree
5SM2425	Simpson Wickiup		UTE 68	A.D. 1752++vv	Wickiup
5SM2425	Simpson Wickiup		UTE 69	A.D. 1805++vv	Wickiup

Table 38. Thermoluminescence Dates from Protohistoric-Era Ceramics.

Site No.	Site Name	Component	Sample No.	Age (Years A.D.)	Calendrical Range
5MN4253	Schmidt Site	Locus 2, #4	UW348	1778 ± 33	1745-1811
5MN4253	Schmidt Site	Locus 2, #4	UW350	1714 ± 45	1669-1759
5MN4253	Schmidt Site	Locus 6	UW345	1411 ± 84	1327-1495
5MN4270	Aldasoro Site		UW344	1503 ± 42	1461-1545
5SM2425	Simpson Wickiup		UW430	1619 ± 50	1569-1669

juniper trees – which are most often represented as wood fuels and as primary structural elements of wickiups – are small enough to be pushed over by an individual if the bases are rotted. Dead trees may stand between 100 and 244 years in the Southwest before becoming capable of toppling by people (Hobler and Hobler 1978). Radiocarbon and dendrochronological dating, of course, only provide dates for the time of tree death. As a result, these methods tend to overestimate the ages of occupations.

Recent thermoluminescence dating of ceramics provides some indication of the degree that radiocarbon and dendrochronological methods overestimate site age. Importantly, thermoluminescence dating is unaffected by the "old wood problem." It, instead, dates the time of ceramic firing. TransColorado Pipeline Project data indicate that thermoluminescence dates from Protohistoric contexts tend to be about one or two centuries more recent than radiocarbon dates from the same deposits (Reed et al. 2001). This is about the same span that trees may stand dead before becoming rotted enough for a person to topple.

The overestimation of site age resultant from the "old wood problem" has important ramifications for dating the Numic immigration. Although the calibrated radiocarbon data shown in Figure 2 suggest the appearance of Protohistoric groups between A.D. 1300 and 1450, the actual time of arrival might have been following A.D. 1500. Thermoluminescence data are too few to address the time of Numic immigration. As shown above, only five credible thermoluminescence dates have been obtained in the UPAP study area. Sample UW345 appears to date sometime between A.D. 1327 and 1495, however, giving limited indication of an early arrival. Additional thermoluminescence dating of Protohistoric ceramics and AMS radiocarbon dating of annuals and short-lived plant parts are necessary to better date the Numic immigration.

For some time, a pronounced decline in the quantity of radiocarbon dates have been noted for the period between approximately A.D. 1650 and 1750 (Reed and Metcalf 1999). The addition of a large quantity of radiocarbon dates from the TransColorado Pipeline Project failed to dispel the hypothesized hiatus; the project's thermoluminescence dates also suggested the legitimacy of the hiatus (Reed et al. 2001). Reasons for the hiatus are unknown, but may include epidemics. Additional chronometric dates from Protohistoric components are necessary to demonstrate that a hiatus is, indeed, represented. If a hiatus is demonstrated, then additional archaeological data will be needed to explain it.

Archaeological Units

Because the function of archaeological units is to enhance communication, and because our understanding of the archaeological record is always changing, continued reevaluation of archaeological units is desirable. Data resultant from future projects conducted on the Uncompahgre Plateau should be used to examine the utility of current Protohistoric-era archaeological units, such as the Antero and Canalla phases (Reed and Metcalf 1999). Indeed, even the Protohistoric era should be evaluated as a concept. Some may disagree with its use of the word "protohistoric" when some portion of the historic period is involved. Others may prefer terms such as "Post-Formative" (e.g., Geib et al. 2001), though that term would seem to overlap the historic Euroamerican period without an additional qualifier.

Greubel (2001) has challenged the utility of the Antero and Canalla phases, pointing out that the phases were defined primarily from historic, rather than archaeological data. The two phases were created to reflect a change from a pedestrian to an equestrian hunting and gathering lifeway, which was, indeed, based on historic documentation (Reed 1988). When the two phases were first defined, very few Protohistoric-era sites had been excavated in the area, and it was presumed that future excavations would reveal important changes in subsistence, settlement patterns, and technology after the adoption of the horse as a beast of burden. Excavation of several Protohistoric components on the TransColorado Pipeline Project, however, revealed that the archaeological remains from sites attributable to the early and late phases were remarkably similar (Reed 2001). Reed et al. (2001) concluded that significant lifeway differences between the Antero and Canalla phases should be detectable as the excavation database grows, but whether this is borne out depends on future research.

Technology

Because relatively few Protohistoric sites on the Uncompahgre Plateau have been subjected to extensive archaeological excavation, the range of variation in key aspects of Protohistoric technology is poorly understood. More basic description of wickiup sites is needed. In his analysis of Ute wickiups, Scott (1988:52) indicated that future research concerning wickiup sites should include the following:

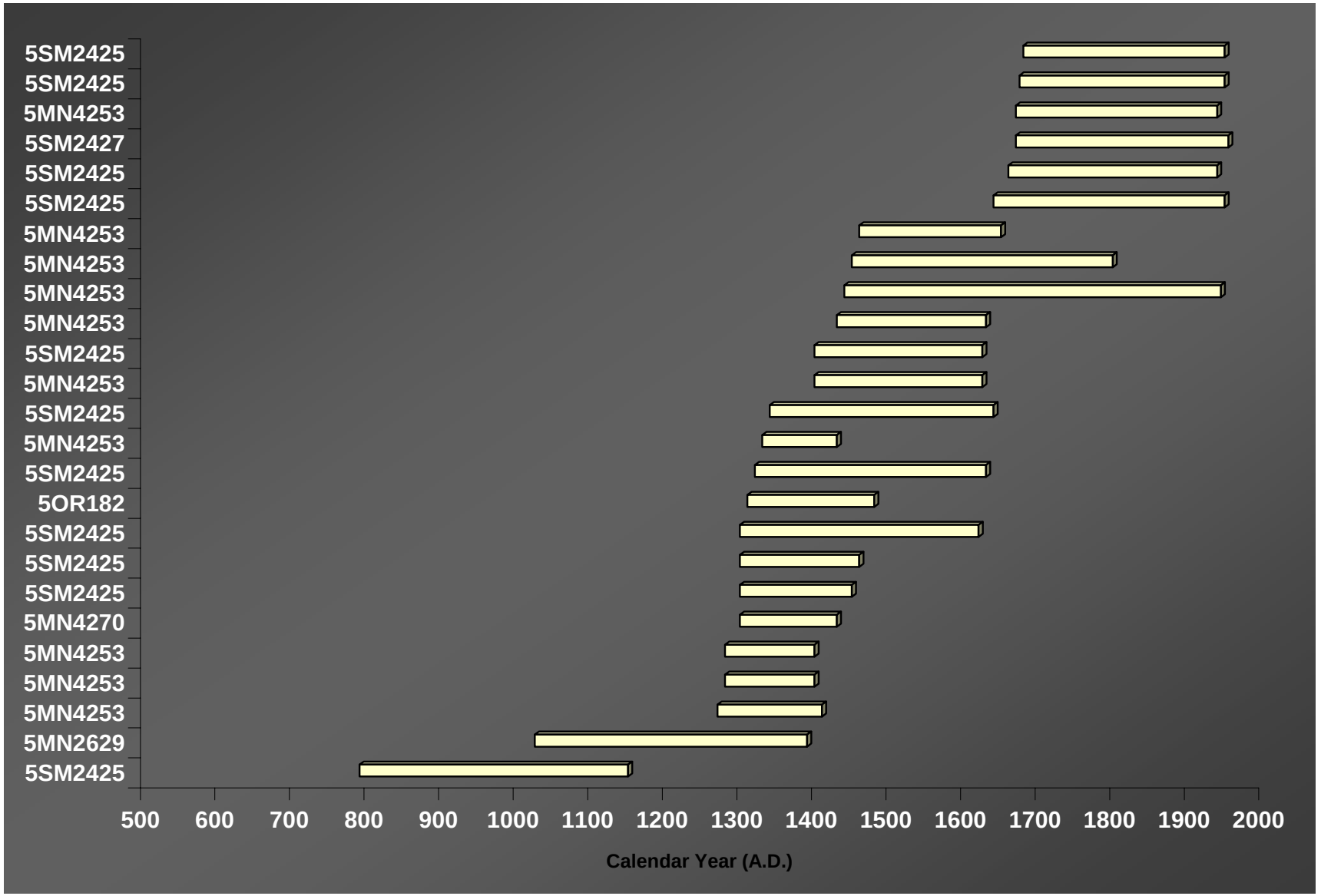


Figure 2. Calibrated ranges of Protohistoric-era radiocarbon dates.

1. Adequate recordation and mapping to begin to understand intrasite and intersite layout or variability;
2. Detailed structural analysis of construction techniques to determine if there are changes through time;
3. Temporal control to determine the age of these structures and to gain better understanding of the date-ranges of associated artifacts; and
4. Study of spatial patterning of sites in terms of their elevational distribution, associated environmental characteristics, and horizontal distributions.

The research objectives listed by Scott (1988) remain appropriate for future archaeological studies. In fact, documentation and investigation of wickiups in the very near future is critically important. It is unlikely that wickiups will remain standing after another few decades. The large majority has already been destroyed or has toppled, and those remaining are becoming increasingly unstable as a result of decomposition and continued exposure to physical threats.

Several wickiup sites have been investigated in the study area as part of the Ute Prehistory Project (Buckles 1971) and the TransColorado Pipeline Project (Reed 2001). These investigations recovered valuable data, some of which have been included in synthetic works relating to Ute architecture (e.g., Sanfilippo 1998). Additional work is needed, however, to increase sample size and to better define patterns.

Although attributes of wickiup construction are important in their own right, wickiups are especially important because they can contribute to our understanding of site structure. Residential architecture is rare at most sites in the region, in spite of recent efforts to identify ephemeral architecture during archaeological excavations. Because the study area is in a temperate climate, structures were probably necessary for human survival during all periods, during most seasons. It is likely, therefore, that brush structures such as wickiups were constructed during all periods of occupation, and that such structures were commonly present at the sites we now classify as nonstructural, open artifact scatters. It is likely that erosion has simply removed all evidence of these relatively insubstantial structures. Certainly, if wood elements were removed from the wickiup sites excavated on the TransColorado project sites, little archaeological evidence would have remained except of the interior hearths, which would have probably been identified as extramural features. The excavation of wickiups and broad areas surrounding them enable archaeologists to understand the distribution of artifacts and features around the structures. This may enable archaeologists to better interpret archaeological deposits where no evidence of habitation structures remains, and to possibly interpolate past structure locations.

Additional research is also needed to better determine the function of various wickiups. This writer once made a public presentation about wickiups, in which the wickiups were represented as primary habitation structures. A Ute member of the audience, Roland McCook, later approached the presenter and asserted that the wickiups were actually menstrual huts, and implied that the majority of the site inhabitants probably lived in teepees (personal communication, 2002). Analysis of the types and quantities of artifacts associated with the wickiups in question would seem to support the interpretation that primary residences were, indeed, represented by the wickiups (see Greubel 2001). Mr. McCook's suggestion, however, points to a need to better discern wickiup function, and to base functional interpretations on substantive data. Criteria for functional classification might reflect the distribution of wickiups across a single site, with hidden or isolated wickiups possibly representing menstrual huts (see Buckles 1971), or artifact and feature richness and diversity. The comment also begs the question: "How can teepee locations be discerned in the archaeological record?" Ethnographic evidence clearly indicates that teepees were inhabited in the region following adoption of the horse as a beast of burden (e.g., Smith 1974). Ethnographic and archaeological data from the region suggest that the perimeters of teepees were not encircled with rocks, unlike some temporary structures on the Plains (Smith 1974; Buckles 1971; Greubel 2001).

Identification of teepee locations will probably depend on attributes of site structure, rather than on direct architectural remnants.

Additional research is also needed to determine whether the season of occupation is reflected in architectural attributes (Sanfilippo 1998). Citing ethnographic data, Buckles (1971) suggests that Ute winter habitations may have been more substantial than summer habitations, though both evidently consisted of a brush framework. Archaeological data do not currently to support the notion of two different structure types, representing cold season or warm season occupations. Regional wickiup types, including freestanding and lean-to, appear to represent minimal investment of construction labor.

Other aspects of Ute technology also merit further examination. As discussed by Reed and Metcalf (1999), dating the appearance of Uncompahgre Brown Ware in the region is an important research objective. This is best accomplished by thermoluminescence dating of ceramic sherds, a method that avoids the "old wood problem" associated with many radiocarbon and dendrochronological dates. Such studies may help determine the time of Numic immigration into the region, or might convincingly demonstrate that artifacts commonly used as diagnostic of Ute culture in the region, such as Uncompahgre Brown Ware and Desert Side-notched points, appeared in the archaeological record at different times.

Further technological analysis of Protohistoric ceramics is also necessary. Many recent investigations tend to classify all local brown wares as Uncompahgre Brown Ware, often without careful analysis. This may result in the inclusion of a very broad range of technological variation within the type, which may, in turn, obscure meaningful patterns of variation. For example, recent investigations at the Simpson Wickiup site (5SM2425) revealed the presence of Dinetah Gray ceramics – an early Navajo type – in contexts that otherwise appear to be Ute (Greubel 2001). Because the apparent trade ware was recognized, it was possible to consider the nature of contact between the Ute and Navajo, a topic previously unexamined in the region. Reed et al. (2001) have recently argued that only one of the two ceramic types defined by Buckles (1971) as Uncompahgre Brown Ware should actually be maintained. They suggest that the fingertip-impressed type, which has a pointed base, should continue to be regarded as Uncompahgre Brown Ware. The plain variety, however, may evince too much variation to be useful as a single type. Although future research may, indeed, once again attribute the plain variety to Uncompahgre Brown Ware, careful scrutiny of the plain ceramics may lead to new interpretations. Additional attention should also be afforded sites yielding corrugated brown ware pottery. Brown ware with partly obliterated corrugations has been identified at several sites in the region. These are unlike Uncompahgre Brown Ware ceramics, though chronometric dating suggests contemporaniety. Corrugated brown ware sherds from the Aldasoro site (5MN4270) on the Uncompahgre Plateau has recently been defined as a new Protohistoric ceramic type, Aldasoro Corrugated (Greubel and Reed 2001a). Efforts should be made to identify additional corrugated brown ware sherds in the study area, and to reassess the utility of the newly created type.

Another line of research needed for the Protohistoric era pertains to changes in ground stone implements. As indicated by data from the TransColorado Pipeline Project, Ute ground stone assemblages may be characterized by higher relative frequencies of basin metates than other archaeological units, including the Archaic (Reed et al. 2001). This may indicate a greater emphasis on grinding dried seeds than exhibited by other units (see Adams 1999). Ute manos and metates also tend to be smaller than those of other archaeological units. If, as Diehl (1996) and Hard et al. (1996) argue, grinding efficiency is reflected by the size of ground stone implements, then Ute grinding implements were less efficient than those of other archaeological units. This may reflect decreased reliance on seed processing, or greater emphasis on implement portability. The sample of complete Ute ground stone artifacts in the TransColorado study was rather small, however, and additional data could produce more tenable interpretations.

The impacts of Euroamerican technology on Ute technology is another line of important research. With the establishment of Fort Roubideau near Delta, Colorado, at around 1830, Euroamerican goods probably became relatively common at Ute sites, though perhaps were seldom discarded. Metal cooking pots, needles, rifles, glass beads, tack, and sundry other Euroamerican artifacts may have displaced their ceramic, stone, and bone counterparts in Ute material culture. The nature of artifactual replacement was probably dependent on a variety of cultural factors, such as relative wealth, desire to maintain traditional practices, the desire to keep Euroamerican artifacts in trading systems with other aboriginal groups for reasons of political gain or prestige, and so on. Currently, the process of the integration of Euroamerican artifacts into Ute material culture has scarcely been studied in the region (but see Horn 1988).

Subsistence

Until recently, Bettinger and Baumhoff's (1982) model of Numic subsistence was the primary subsistence model used in the region (Reed and Metcalf 1999). Bettinger and Baumhoff's model stated that Numic immigrants were able to supplant the indigenous occupants of the region by employing a more labor-intensive subsistence system, which included more extensive use of lower-ranked food resources. Subsistence models based on local archaeological data could not be formulated because of the dearth of excavation data for the Protohistoric era.

The TransColorado Pipeline Project produced a considerable amount of subsistence data pertaining to the Protohistoric-era occupation of west-central Colorado, which permitted the development of a new subsistence model. This model, developed by Reed et al. (2001), indicates that the Ute actually focused on highly ranked food resources, quite the opposite of Bettinger and Baumhoff's model. TransColorado project faunal data indicated that the types of animals procured by the Ute were more similar to those procured by Archaic peoples than they were to the Formative-era groups. Both the Archaic groups and the Ute made some use of rabbits, hares, and rodents, but concentrated mainly on deer. Other large animals, like bighorn sheep, pronghorn, elk, and bison, were less intensively hunted. The local Formative-era foragers, in contrast, focused more heavily on rabbits, hares, rodents, and birds; deer and other artiodactyls were less frequently taken.

Although the Ute were able to focus their hunting on deer, they apparently found it necessary to intensively process deer bones. Frequencies of large mammal bone from Ute contexts that were too fragmentary to identify far exceeded that of other archaeological units. It is possible that the presence of ceramics in Ute material culture made it easier and more efficient to boil processed bone; Archaic groups would have had to employ stone boiling in fabric or animal tissue containers.

TransColorado Pipeline Project macrofloral data also indicate that the Ute used a narrower range of plant foods than did the region's Formative-era foragers. In general, the wider the diet breadth, the more likely it is that lower-ranked food resources are incorporated. Ubiquity indices indicated that Formative-era foragers utilized more than three times the number of plant foods than did the Ute, and more than twice the number than the Archaic groups.

In short, the new subsistence model indicates that Ute subsistence practices were much more like those of Archaic groups than they were like regional Formative-era groups. The Ute were able to focus on a narrower range of plant and animal foods, as well as more highly ranked animal foods. The model merits further examination, however, especially in light of additional excavation data. The model is based on small samples, and additional data are needed.

Settlement Patterns

In general, models for Protohistoric settlement patterns are similar to those of the Archaic era (Reed and Metcalf 1999). Protohistoric groups are thought to have employed the "up-down"

settlement pattern, wherein groups traveled between elevation zones to exploit the periodicity of food resource maturation. Summers may have been spent in the high elevations, and winters in the middle elevations where deer and elk over-wintered. The lowest elevations – below the pinyon and juniper woodlands -- were probably primarily used in the early spring. It is also possible that the major river valleys were used in the winter, but archaeological data for those areas are scant because of modern settlement and land-use patterns. This model, though based on ethnographic works (e.g., Opler 1963), has by no means been convincingly demonstrated with archaeological data, because reliable indicators of season of site occupation are seldom recovered. Plant remains, especially seeds, tend to be poor indicators of season of occupation because they can be stored. The maturation dates of seeds found in archaeological contexts all too often are used to interpret season of occupation. Because all seeds mature during the warm season, many sites attributed to a specific season are attributed to the warm season. Winter habitations, therefore, have been underrepresented. Winter sites may have been occupied for longer periods than warm season sites, due to increased labor associated with construction of a structure capable of deflecting cold winds and snow. Winter sites should, therefore, tend to be more visible in the archaeological record than warm-season sites. There is no reason to believe that Protohistoric groups over-wintered outside of west-central Colorado. Faunal data, such as the presence of fetal bone or tooth eruption sequences, are more reliable indicators of season of occupation than are seeds. Future investigations should examine season of site occupation whenever possible.

The preceding chapters discussing the Archaic and Formative eras have utilized a polythetic classification scheme to discern patterns of actual and anticipated mobility. The scheme is based on Kent's (1992) work, and is believed to explain a considerable amount of variation between sites. To compare Ute mobility to sites of other archaeological units, the Ute sites that have been excavated in the UPAP study area are similarly classified. As before, sites are placed into one of four mobility groups; these include (1) anticipated long-term, actual long term; (2) anticipated long term, actual short term; (3) anticipated short term, actual long term, and (4) anticipated short term, actual short term. Data for some of the sites excavated in the 1960s are scant, which might result in some degree of classificatory error.

Of the 13 classified sites, none represent anticipated long-term, actual long-term occupation (Group 1) (Table 40). Locus 6 at the Schmidt site (5MN4253) is the only site that appears to represent anticipated long-term, actual short-term occupation (Group 2). The Locus 6 component had a habitation structure and pit features that evidenced more investment of construction labor than features at other Protohistoric components, yet yielded few artifacts. Three sites probably represent anticipated short-term, actual long-term occupation (Group 3), and four sites represent anticipated short-term, actual short-term occupation (Group 4). Similar relative frequencies for the various mobility groups were obtained at Ute components excavated as part of the TransColorado Pipeline Project (Reed et al. 2001).

The mobility group assignments are substantially different than those made for the Formative-era components in the UPAP study area. Of the Formative-era components, 51 percent were classified as anticipated long-term occupations (Groups 1 and 2), compared to 8 percent of the Protohistoric components. The Protohistoric components clearly evince a pattern of higher residential mobility, where most sites were anticipated for short-term occupation. In terms of mobility, the project's Protohistoric components more closely resemble the set of Archaic components, where sites predominantly represented anticipated short-term occupations. These general patterns were also detected among the Archaic, Formative, and Protohistoric components from the TransColorado Pipeline Project that were assigned to mobility groups (Reed et al. 2001). Regional settlement patterns were not static through time, as the Formative era was a time of substantial change.

Diachronic variation in settlement patterns on the Uncompahgre Plateau may also be indicated by differential use of elevation zones. It might be expected, for example, that Archaic and Protohistoric components should show greater variation in elevation setting, as these groups were in no way tied to the lower elevations because of the requirements of horticulture. As shown on Table 39), however, the variation between groups is not great. All groups occupied the elevations less than 6,000 ft (1,829 m) at a lower frequency than would be expected if sites were randomly scattered across the study area. Elevations between 6,000 and 7,000 ft (1,829-2,134 m), however, were far more intensively occupied by all groups than expected. Formative and Protohistoric sites are especially likely to be clustered in that zone. The higher elevation zones tended to be less intensively occupied than expected, though Archaic sites occur more often between 7,000 and 8,000 ft (2,134-2,438 m) than would be expected, unlike sites attributed to the other archaeological units. The highest elevations, above 9,000 ft (2,743 m) comprise a small percentage of the study area, but were utilized by all groups more frequently than expected. Although the hypothesis of differential use of elevation zone is not supported, it is possible that the hypothesis is correct, but that survey-level data are inadequate for addressing it. Excavation data that conclusively demonstrates site age and function may be necessary to further test the hypothesis.

Table 39. Protohistoric Utilization of Elevation Zones.

Elevation Zone (Ft)	Elevation Zone (M)	Elevation Zone Percentage Of Study Area	Percent Of Protohistoric Sites	Percent Of Formative-Era Sites	Percent Of Archaic-Era Sites
Less than 5,000	Less than 1,524	6	2	0	1
5,000 – 6,000	1,524 -- 1,829	23	14	17	14
6,001 – 7,000	1,829 – 2,134	29	51	59	37
7,001 – 8,000	2,134 – 2,438	25	19	16	32
8,000 – 9,000	2,438 – 2,743	16	10	7	13
Above 9,000	Above 2,743	1	4	2	3

Particularly Important Sites

As with any archaeological unit, important Protohistoric-era sites will consist of those retaining contextual integrity, so that the distribution of archaeological remains can provide insight into the distribution of past human activities. Sites with cultural features or culturally stripped trees that can be chronometrically dated are also highly valued, because they are most likely to yield tenable dates, so important for finer-grained archaeological interpretations.

Within the group of significant sites, sites with standing wickiups or collapsed, but undoubted, wickiups are particularly important. As described above, these fragile structures are important for architectural and site structure studies, and are disappearing at a rapid rate (Figure 3). The Schmidt site (5MN4253), where large blocks around wickiups yielded valuable data, remains very important because other, as yet undetected structures may be present at the site. The Monitor Mesa wickiups investigated by Buckles (1971) remain important. Although the structure interiors have been excavated, extramural areas remain that would probably yield important site structure data. Overall, however, every site with definite wickiups, collapsed or standing, should be managed as very important cultural resources.

Protohistoric sites with ceramics are also particularly important resources. Additional studies of Protohistoric brown wares are necessary to better define ceramic variability.

Figure 15. Distribution of Protohistoric wickiups.

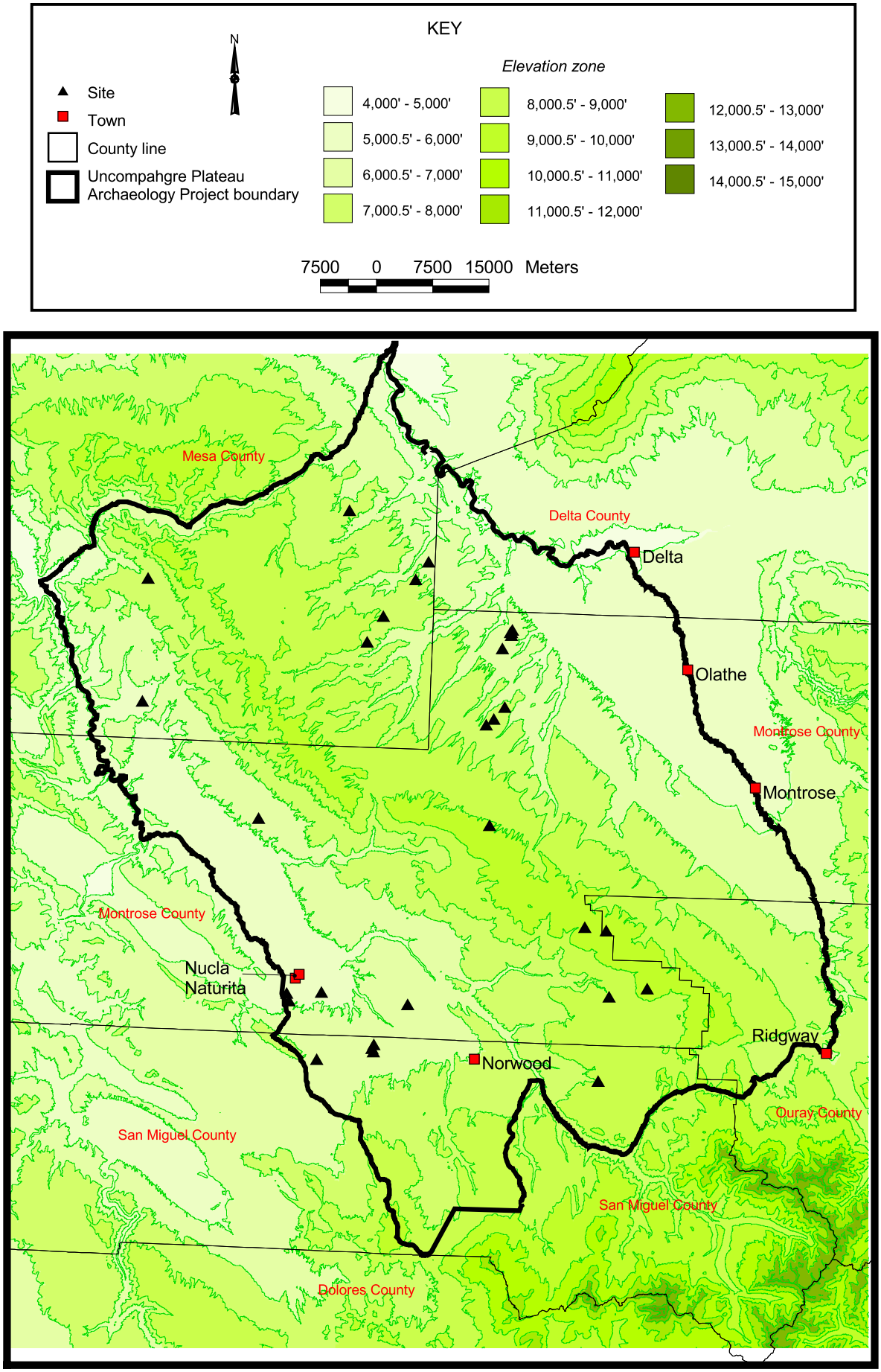


Figure 15. Distribution of Protohistoric wickiups.

Table 40. Mobility Indicators for Protohistoric Components.

Variable	5MN13	5MN18	5MN40	5MN41	5MN42	5MN44	5MN65	5MN4253 Locus 1	5MN4253 Locus 2 #4	5MN4253 Locus 6	5MN4270	5SM2425 Com. 4	5SM2425 Com. 5
Structure Labor				low	low	low	low	low	low	medium		low	low
Pit Feature.Labor	low	low		low	low	low	low	high	high	high	low	low	low
Storage Feat. Labor													
Mean Size FCR									0.38 kg			0.09 kg	0.14 kg
Ceramic Labor	low	low		low					low			low	
Exotic Ceramics												yes	
Debitage Density			178				0	0.9	48.3	3.1	1.4	30.0	28.2
Reduction Strategy								biface	biface	biface		both	both
Expedient Tools	0.42	0.57	0.18	0.40	0.50	0	0	0.33	48.3	0.36	0	0.32	.0.33
FST Classes	5	0	5	5	2	0	0	low	high	low	low	high	high
Tool Diversity Index	588	0	275	35	4	0	0	6	2160	56	2	1432	384
Ornaments	yes							no	yes	no	no	no	yes
Milling Technology Labor	low		low	low	low			low	low		low	low	low
Bone Grease Production								yes	yes	yes	no	yes	yes
Fauna Diversity								low	high	high	low	low	high
Floral Food Diversity								low	low	low	low	high	low
Fuel wood Diversity								low	high	low	low	low	low
Site Cleaning									some	some		yes	some
Shelter Quality	low	high	low	low	low	low	low	low	low	low	low	low	low
Mobility Group	**3**	**4**	**3**	**4**	**4**	**4**	**4**	**4**	**3**	**2**	**4**	**3**	**3**

Chapter 8
Summary of Research Objectives and Examination of Site Significance Issues

Summary of Research Design Objectives

Management of prehistoric and protohistoric sites within the UPAP study area should be guided by research needs. Sites that have the potential to yield data that can be used to refine the models of past use of the study area or to address specific research questions should be regarded as significant resources, worthy of protection or scientific investigation. Sites with the potential for yielding important scientific information meet criterion "d" for eligibility for listing on the National Register of Historic Places. The research design presented above, in conjunction with the research design for the Northern Colorado River Basin (Reed and Metcalf 1999), provide contexts for evaluations of site significance. Methods for using site data to form tenable significance recommendations are presented below. First, however, some of the more important archaeological models and research objectives applicable in the UPAP study area are summarized, focusing on this project's research design.

Paleoindian Era

Data Gaps

- Sites with Paleoindian artifacts comprise less than 1 percent of the sites in the study area, and only one site has been identified by archaeological excavation. Paleoindian sites, then, comprise a major data gap. Early Paleoindian sites are especially rare.

Chronology

- Basic chronological data, such as when Paleoindians first immigrated into the UPAP study area, need to be addressed.
- Various Paleoindian projectile points occur in the study area that are roughly coeval. Chronometric dates are needed to determine whether the types represent contemporaneous or sequential use of the area by various Paleoindian groups.
- The time of transition between Paleoindian and Archaic lifeways needs to be established with local chronometric data.

Archaeological Units

- Pitblado (2003) suggests that various groups of Paleoindian peoples utilized western Colorado, and made different projectile point types. Other interpretations may also be plausible, such as diachronic changes within a single group or use of different projectile point types for different hunting situations. A broad range of archaeological topics need to be examined to best devise the region's archaeological units.
- Unless archaeological units are to be used simply to describe differences in projectile point types, differences in subsistence, settlement patterns, and similar systems need to be examined to determine the degree of variation between late Paleoindian and early Archaic lifeways.

Settlement Patterns

- Understanding Paleoindian settlement patterns is contingent upon understanding local paleoenvironments. Because little paleoenvironmental data are available for the area for the era in question, additional research is sorely needed.

- According to Kelly and Todd (1988), the early Paleoindians practiced a highly mobile lifeway that was unparalleled during all subsequent periods. Their hypothesis is testable in the study area, if sites dating to that period can be identified and investigated.

Technology

- All aspects of Paleoindian technology warrant further investigation, especially habitation structures and lithic artifacts other than projectile points.

- Discern whether different Paleoindian groups have different degrees of representation of "reliable" versus "maintainable" lithic technologies.

Subsistence

- The Foothill-Mountain tradition assumes that local Paleoindian groups employed a rather broad-spectrum subsistence focus when compared to Plains-centered groups, but direct subsistence data are sparse. Additional floral and faunal food resources from Paleoindian contexts need to be identified.

- Test the hypothesis that early Paleoindian peoples focused on higher-ranked food resources than late Paleoindian peoples.

Archaic Era

Data Gaps

- Although considerably more Archaic-era sites have been identified in the study area than Paleoindian sites, the archaeological database for the era is too small to permit development of sophisticated lifeway models. The Archaic era refers to a period approximately 6,000 years long; to date, only about a dozen Archaic sites in the study area have been substantially excavated. Additional excavation data are needed for all periods within the Archaic era.

Chronology

- Additional chronometric dates are needed to better discern diachronic demographic trends, especially for the Settled period.

Archaeological Units

- The utility of the newly defined periods for the Archaic era (Pioneer, Settled, Transitional, and Terminal) should be evaluated.

Settlement Patterns

- The "up-down" settlement model, though probably essentially adequate, requires verification with archaeological data.

- Patterns of residential mobility certainly changed between eras, but also probably changed during the six millennia of the Archaic era. These patterns might be discernible when the quantity of excavated Archaic site increases.

- The settlement models of the high elevations of the Uncompahgre Plateau during the period before cal 1160 B.C. need to be compared and contrasted to those of the Gunnison Basin. Data tentatively suggest important differences.

Technology

- Variation in Archaic architecture and pit features needs further exploration.

- Additional study of Archaic lithic reduction strategies is needed, especially in the context of anticipated mobility and of distance to raw material sources.

Subsistence

- Because of the dearth of excavated Archaic sites in the region and because biological materials at older sites are less often preserved, our understanding of Archaic subsistence practices is incomplete. Important subsistence changes are likely during the 6,000-year span of the Archaic, which can only be detected through additional data recovery efforts.

- Apparent Archaic subsistence focus on highly ranked faunal and floral food resources merits further examination, which might also illuminate small-scale variation in response to environmental and cultural challenges.

Paleoenvironment

- Some variation in the archaeological record can probably be explained by fluctuations in the environment. Few paleoenvironmental models, derived from local data, have been developed. Paleoenvironmental studies are needed for all archaeological units.

Formative Era

Data Gaps

- Because most Formative-era structural sites were dug decades ago to standards not matching those of the present-day, the quality of the archaeological database is uneven.

Chronology

- Current evidence suggests that horticulture was practiced in the study area in two periods, with an intervening period without horticulture. Additional chronometric data are needed to test this model.

- Chronometric data are needed to better define the appearance and the disappearance of cultigens in the study area.

Archaeological Units

- The utility of the Gateway and Aspen traditions warrant examination, especially in light to recent discoveries of corn at sites that outwardly appear similar to forager sites.

- If local horticultural and foraging groups are regarded as distinct, the nature of their interaction needs to be illuminated.

- Reasons why the Formative-era lifeway terminated in the region is a mystery, though evidence elsewhere in the Southwest suggests that the reasons were complex.

Settlement Patterns

- Currently, settlement models that reflect integration of corn horticulture are simplistic and are not based on empirical regional data. Problem-oriented research is needed to refine the settlement models of regional farmers.

- The large majority of Gateway tradition sites are in western Montrose and San Miguel counties, rather than in the Uncompahgre River drainage. Although environmental factors may be involved, they are poorly understood.

- The relationship of anticipated/actual mobility patterns to elevation and environmental setting needs examination.

- As with all archaeological units, understanding the season of site occupation is important for more fully understanding settlement patterns.

Technology

- Variation in Formative-era architecture needs to be examined.

- It is possible that Gateway tradition sites employed a different lithic reduction technology than evident at contemporaneous forager sites, if such strategies reflect relative mobility.

Subsistence

- Recent models that suggest that the Formative-era groups of the study area exploited a wider range of food resources than Archaic or Protohistoric groups should be further examined.

- The relative importance of corn in Formative subsistence systems could be highly variable, according to optimal foraging theory and ethnographic evidence. Analysis of this topic is important. An associated research concern would be to identify which of the four models of traditional horticulture described by Barlow (2002) might be represented in the study area.

- If there was a hiatus in corn use during the Formative era, then the reasons why farming was temporarily abandoned needs to be identified.

Protohistoric Era

Data Gaps

- Although several Protohistoric sites have been excavated in recent years, the quantity remains low, which affects the quality of archaeological interpretations.

Chronology

- Accuracy in chronometric dating is especially important for Protohistoric-era components, especially because data from some sites can be integrated with the historic record, which is highly precise. Special care should be taken to employ the most accurate dating methods possible, possibly including AMS dating, thermoluminescence dating, and dendrochronological dating of culturally stripped trees. Cross-dating of Euroamerican artifacts can also provide excellent dates.

- Thermoluminescence dating of Protohistoric pottery has the potential to accurately date the appearance of locally made pottery in the study area and might provide insight into the timing of the Numic immigration.

- Research is sorely needed to determine whether there was a hiatus in occupation or population decline between approximately A.D. 1650 and 1750.

Archaeological Units

- The Canalla and Antero phases merit further examination for usefulness; this research should focus on identifying differences between the two that are manifested in the archaeological record.

Settlement Patterns

- Mobility modeling currently suggests that Protohistoric groups were as mobile as Archaic groups. This interpretation may change if Archaic pit structures similar to Yarmony House (Metcalf and Black 1991) or Archaic basin houses are identified in the study area. It seems probable, therefore, that Protohistoric residential mobility was higher than for all other archaeological groups, excepting the Paleoindian. Data are needed to test this hypothesis.

- The apparent absence of habitation structures more substantial than wickiups suggests that Protohistoric groups were as mobile in the cold months as they were during the warm months. High residential mobility during the winter months might represent a different settlement pattern than that practiced by preceding archaeological units. Additional efforts are needed to discern season of occupation for all excavated sites.

Technology

- Variation in wickiups needs further illumination. Analysis is also needed to determine the function of wickiups; some might represent family residences, whereas others might represent menstrual huts.

- The variation is Protohistoric ceramics needs further examination. Not all might best be attributed to Ute manufacture.

- Local Protohistoric groups appear to have made less use of ground stone than groups of other archaeological units. Ground stone analyses are needed to confirm and explain this trend.

- The effects of Euroamerican trade goods on indigenous material culture is poorly understood.

Subsistence

- Current models suggest that local Protohistoric groups focused more on highly ranked food resources than did Formative groups. This was not simply a matter of choice; there must have been reasons that Protohistoric groups were able to do so, unlike their immediate predecessors. Research is needed to explain Protohistoric subsistence strategies.

- Additional studies are needed to confirm whether Protohistoric groups more intensively processed animal bone than groups of other archaeological units.

Site Significance

One of the most important tasks within the field of archaeological resource management is classifying the significance of sites. Whether or not a site is classified as significant determines its fate; significant sites may be protected or subjected to archaeological data recovery, whereas insignificant sites are left to the ravages of erosion or construction without further consideration. As Reed and Metcalf (1999) argue, economic and political concerns make it impractical to classify all sites as significant resources. Cultural resource managers must, therefore, make determinations regarding which sites are worthy of protection and worthy of the economic costs associated with that protection.

For the large majority of aboriginal sites, significance classifications are based on a site's potential for yielding information important to prehistory; i.e., criterion "d" for eligibility for listing on the National Register of Historic Places. Potential for making substantive contributions to our understanding of prehistory is, of course, not an either/or proposition, and might better be perceived as a normal statistical distribution, wherein research potential is, more or less, continual between the two extremes. With such a model, there is no easily determined point that would segregate

insignificant from significant sites. The point separating significant from insignificant sites will invariably be somewhat arbitrary, and differences opinion will be unavoidable. The point of separation may also change through time, as economic and political conditions change; for example, a wealthy nation can afford to protect a larger proportion of its archaeological resources than an impoverished one. Most drift in significance evaluations, however, reflects changing research objectives. As new theoretical or methodological innovations arise, the set of sites best suited for addressing the needs of the new approaches is likely to change.

In spite of the importance significance classifications, many archaeologists working in the western Colorado dedicate little discussion to the issue. Often, significance recommendations consist only of a sentence or two. Although brief recommendations are sometimes appropriate, such as when a site has been destroyed by construction or has demonstrated the presence of important buried cultural deposits, most sites fall in the middle section of the significance continuum and so merit thoughtful discourse.

Adequacy of significance recommendations also depends on assessing the appropriate site attributes. Simply put, some site attributes are more important than others when significance recommendations are formulated. Archaeologists working in or near the UPAP study area examine a fairly wide range of site attributes when making recommendations, though commonly, only a few attributes are considered for an individual site. In an unsystematic review of significance recommendations, attributes that are often examined include site size, quantity and diversity of surface artifacts, site integrity, presence of diagnostic artifacts, presence or absence of cultural features and structures, potential for buried cultural deposits, the presence or absence of relatively unusual artifact types, and whether the site is in some way unique. The strengths and weaknesses of these and other site attributes are examined below.

Integrity of Cultural Deposits

The contextual integrity of a site's cultural deposits is the single most important attribute for formulating significance recommendations. Contextual integrity refers to the degree that the distribution of artifacts and features reflects the distribution of prehistoric activities. A site with excellent contextual integrity may have been subjected to site cleaning, trampling, and other activities that remove artifacts from their original points of use or discard, because these activities also inform about prehistoric activities. Contextual integrity can be compromised or destroyed by erosion, construction, or by modern agricultural practices. A site without contextual integrity might include one where all artifacts have been redeposited in a streambed as a result of water action. Assessment of a site's contextual integrity involves careful consideration of the geomorphological setting and the impacts of historic or recent developments.

Site Size

Large sites are commonly considered to be more important than small sites. This is unfortunate, for, as Glassow (1985) points out, a good understanding of the nature of patterns of prehistoric land use can only occur when the full range of site types in an area is described. The bias towards large sites leads to overrepresentation of multicomponent sites and sites that were occupied for long periods. Long-term habitation sites might be selected for preservation, at the cost of the more common short-term, resource procurement, or processing locations. In some cases, it may be argued that small sites have research potentials superior to large sites. Small sites tend to have fewer reoccupations, which means less mixing of artifacts and ecofacts between unrelated occupations or components. Small sites can also be more completely studied or excavated than large sites, if funding is limited. Large sites can also yield important data, however, especially if components or occupations are spatially segregated. In short, site size should seldom be used in support of significant recommendations.

Quantity of Surface Artifacts

A paucity of surface artifacts is often used in arguments for recommendations of insignificance. The relationship between quantity of surface artifacts and a site's research potential is not strong, though sites with artifacts generally contain more scientific information than sites without artifacts. The critical factor to consider is the site's geomorphological setting. Where soils are aggrading, archaeological deposits tend to become buried. Unless there are agents of soil disturbance, such as rodent activity or localized erosion, important cultural deposits with abundant artifacts may be mostly obscured where soils are accumulating.

Diversity of Surface Artifacts

The diversity of surface artifacts is often used in tandem with artifact quantity when making significance recommendations. Sites with low artifact diversity are often regarded as insignificant, because few prehistoric activities are thought to have occurred. Artifact diversity is somewhat correlated with the types of activities represented at a site, but is best regarded as a function of sample size. Large artifact samples tend to be associated with high artifact diversity and richness, and small samples tend to be associated with low degrees of artifact diversity and richness. As with the quantity of surface artifacts, the artifact diversity should only be considered in the context of a site's geomorphological setting and its potential for buried cultural deposits.

Presence of Diagnostic Artifacts

Sites yielding diagnostic artifacts are often regarded more highly than sites lacking them. This view is tenable, because when a site can be attributed to a specific archaeological unit, then a specific set of research questions developed for that archaeological unit can be applied to site investigations. The variable should not weigh heavily in significance evaluations, however, because diagnostic artifacts are frequently collected by others, and because site activities do not always involve disposal of tools. Simple sampling error may also be a factor in whether specific types of artifacts make their way to the site surface. When sites lacking diagnostic surface artifacts are excavated, they frequently yield datable cultural features or diagnostic artifacts, whereupon unit-specific research questions can be applied.

Presence of Cultural Features or Structures

Sites with cultural features or habitation structures detectable on the surface are usually considered to be more significant than sites without such attributes. This is appropriate, because cultural features like hearths can yield chronometric dates and important subsistence data, and habitation structures usually contain floor surfaces and architectural details of research interest. Where site soils are not highly degraded, the presence of eroded cultural features may indicate high potential for other, buried features, as the eroded features indicate that the range of site activities included feature construction and use. As with the case of many of the other site attributes discussed above, the site's geomorphological setting should be considered when assessing the research potential indicated by the surface features.

Depth of Cultural Deposits

Sites with deep cultural deposits are often recommended as significant, whereas sites with shallow cultural deposits are often regarded as insignificant. Depth of artifact burial is often cited as evidence for the research potential of a site's cultural deposits. By itself, depth of cultural deposits poorly reflects a site's potential for yielding important scientific information. Although some sites are clearly degraded to a point that all cultural materials are compressed onto a single surface, perhaps even on bedrock, and so merit classification as insignificant, most sites in the study area retain some degree of artifact burial. Sites such as the Tenderfoot site near Gunnison, Colorado, demonstrate that even shallow soils can yield buried cultural features and artifacts of great interpretive importance (Stiger 2001b). Sites with deep archaeological deposits, on the other hand,

can be of little research value if materials have been redeposited by slope wash or have been extensively reworked by rodents. Depth of cultural deposits is far less important than the integrity of those deposits and should not, by itself, be taken as evidence of site significance.

Presence of Uncommon Artifacts

Some significance recommendations are based, in part, on the presence of uncommon artifacts. In west-central Colorado, obsidian and ceramics are rare, and their occurrence may be used to argue for site significance. This is appropriate, because such artifacts can provide important archaeological data. Obsidian can be subjected to trace-element analysis to determine is geological source. This, in turn, provides information about prehistoric trade. Ceramic artifacts can yield similar information about trade, but can also yield important technological data. Other uncommon artifacts that would have similar types of values might include perishable artifacts from sheltered deposits.

Potential for Multiple Components

Some archaeologists in the area cite the potential for multiple components – either vertically or horizontally distributed -- in arguments for sites being significant. Whether multiple components add or detract to a site's research potential depends on whether the components are discrete. If the components spatially overlap, it is often very difficult to determine which features and artifacts represent the remains of which prehistoric occupation. When cultural materials from different components are mixed, then variability is increased, and important patterns may be obscured. If various site components are clearly segregated, and mixing is minimal, then a site can yield information about how different groups utilized similar environmental settings and, thereby, better illuminate diachronic changes.

Degree of Commonness

Some evaluations of site significance include assessments of the commonness of the site types. These efforts usually regard sites that represent the most common site type in the region as insignificant, and classify sites with unique attributes as significant. Lithic scatters without apparent surface features comprise the most common site type in the region, and such an approach often results in large numbers of prehistoric sites being recommended as insignificant. This approach is untenable, at least for aboriginal sites. Lithic scatters without apparent features may reveal features and associated artifacts when excavated, depending on the site's geomorphological setting. Lithic scatters also tend to represent the activities of prehistoric hunters and gatherers, who represent a lifeway that endured and changed over thousands of years. Our understanding of this lifeway and its local variations are far from complete, and the common lithic scatters hold the key to our enlightenment.

Whether a site is significant because of associated unique attributes depends on the nature of those attributes. Masonry architecture, brush structures, and stone alignments are uncommon in the area and would permit application of important research questions, but unimportant attributes that would render a site as unique with little research value can also be imagined.

Tenable Criteria for Site Evaluations

As evident from the discussion above, not all site attributes contribute equally in the formulation of tenable significance recommendations. Several key issues repeatedly emerge as especially important. The first, and most important, is contextual integrity. If artifact distributions do not inform about the distributions of prehistoric activity areas, and associations between artifacts and features cannot be confidently ascertained, then the site has little research potential. Determination of contextual integrity is not necessarily easy, however, especially with survey-level data. Excavation data are often most suitable for determining contextual integrity, but significance

recommendations usually precede excavations. How, then, might one discern contextual integrity from surface attributes?

The answer lies in understanding site formation processes (see Schiffer 1987). An archaeologist working in the study area should be familiar with common types of natural soil mixing, such as faunalturbation, floralturbation, cryoturbation, graviturbation, argilliturbation, alluvial and colluvial processes, mass wasting, and eolian processes. These types of pedoturbation are manifested in many ways, and a professional archaeologist should at least be able to recognize extreme cases during inspection of site surfaces. Sites retaining contextual integrity, however, tend to share common attributes, which are listed below. The more attributes a site has, the more tenable are assessments of integrity. The list should be used cautiously, as there are exceptions to every case.

- Site occurs in a level or gently sloping setting or on the lee side of a hill, ridge, or other topographic rise.
- At least portions of the site occur outside of an erosional feature, such as a streambed or blowout.
- Site sediments containing cultural materials tend to be fine-grained rather than gravels or cobbles, indicating a low-energy depositional environment.
- Site soils exceed 10 cm deep, at least in places where activity areas are suspected.
- Cultural features with apparently associated artifacts occur.
- Artifact concentrations are evident that are outside of erosional features.
- Surface artifacts are not highly size-graded, i.e., artifacts of various sizes are found.
- At least portions of the site occur outside of an obvious construction area and outside of plowed fields.
- Either a single component is suspected, or multiple components are spatially segregated.

Site attributes such as site size, quantity of artifacts, diversity of artifact classes, and degree of site type commonness are intentionally excluded as characteristic of significant sites. These attributes tend to discriminate against small, single-component sites, which can be of considerable research interest. This bias is especially problematical in high elevations, where sites tend to be small and not especially complex. Classification of large percentages of high elevation sites as insignificant would result in a poorer understanding of that topographically rare environment. Also absent on the list of common attributes of significant sites are variables like presence of uncommon artifacts, structures or features, and diagnostic artifacts. The presence of such materials strengthens ones confidence in significance classifications; however, the absence of such materials by no means implies that they will not be found in buried contexts at the site.

Matrix for Site Evaluations

For some projects, the range of the research potential of a set of sites is most easily presented in a matrix, wherein attributes associated with high research potential are given numerical scores, and where scores are multiplied by weighting factors that reflect the relative value of the subject attribute to discerning research potential. Use of matrices in evaluating site significance has the advantage of placing sites within the context of a larger set of sites, and is explicit (Weisman 2002; Reed 1987). The matrices also promote the idea that the research potential of a set of sites forms a continuum from worthless to highly valuable, with most sites somewhere in between.

An example of a significance matrix is developed below. The variables are presented, along with scores that reflect degrees of research data potential. Weighting values are also suggested; these rank the relative value of a variable for evaluating site significance. Although this matrix may prove useful for some inventory projects, it is herein presented primarily to refocus discussions of site significance on the most important criteria. The formulation of more tenable significance recommendations will improve the management of archaeological sites in the Uncompahgre Plateau study area.

Contextual Integrity

This variable is assigned scores from 1 through 3 to reflect the degree of contextual integrity evident on the site's surface. A score of 1 indicates low potential for contextual integrity. Sites given a score of 1 would evidence a degree of erosion or construction disturbance that would make archaeological excavations fruitless. A score of 3 would be given sites that evidenced multiple characteristics of contextual integrity, as presented above. These sites not only have evidence of contextual integrity, but also have surface indications that provide information about the location of specific areas with high subsurface research potential. Sites between the two extremes would be awarded a score of 2. Because contextual integrity is the single most important variable when considering site significance, it has a weighting value of 5.

Potential for Buried Cultural Deposits

The potential for buried cultural deposits is primarily determined through consideration of the site's geomorphological setting, though factors such as surficial hearths might also be considered. Sites with the potential for buried cultural materials are, of course, valued above those lacking them, because buried deposits can yield larger artifact samples and important cultural features. Scores for this variable range from 1 (the lowest) to 3 (the highest). A high score would be awarded a site evincing low-energy soil aggregation, uneroded areas of sites adjacent to eroding areas where artifacts are emanating, or hearths evident on the surface that have not been entirely destroyed. A score of 1 might be a site on bedrock or a shallow site in a plowed field. Scores for this variable are multiplied by a weighting factor of 3.

Presence of Habitation Structures

As indicated by the project's research design, sites with residential architecture are very important. Although basin houses or pithouses would seldom, if ever, be discernible from the ground surface, masonry structures of the Formative era and Protohistoric wickiups are often visible. These habitation structures are important, not only because they contain information about architectural variability, but also are important for site structure studies. Sites with structures are given a score of 1, and sites lacking them are given a score of 0. Because structures are so important from a research standpoint, the scores are multiplied by a weighting factor of 3.

Presence of Thermal Features

Thermal features, such as hearths and roasting pits, provide important data. Radiocarbon samples can often be extracted, which provide critically important chronometric data. Macrobotanical, archaeofaunal, and other ancillary study samples related to utilized biological resources can also be extracted. Sites with visible thermal features that retain some degree of integrity are given a score of 2. Sites with visible thermal features that have been destroyed by erosion are scored as 1, if there is some possibility that other features may be buried at the site. Sites with no possibility of thermal features are given a score of 0. Because of the importance of the data contained in thermal features, the variable is given a weighting factor of 3.

Presence of Materials Suitable for Thermoluminescence Dating

Ceramic sherds thicker than 6 mm and intensively burned rock may provide thermoluminescence dates. These dates may be superior to radiocarbon dates, especially at sites in the more recent archaeological units, because they are unaffected by the "old wood problem." Archaeological interpretations are enhanced when multiple chronometric dates are obtained and when multiple lines of site dating are employed. Sites with materials suitable for thermoluminescence dating are given a score of 1, and sites lacking them are scored 0. Scores are multiplied by a weighting factor of 3.

Presence of Materials Suitable for Tree-Ring Dating

Beams sheltered in alcoves, Protohistoric wickiup beams, and culturally stripped trees can provide tree-ring dates. Dates from stripped trees reflect actual cultural events and avoid the "old wood problem" resultant from use of dead trees, so are especially valuable for chronometric dating if they can be attributed to an archaeological component. For scoring purposes, sites with materials suitable for tree-ring dating are given a value of 1, and sites lacking such materials are given a score of 0. Because the variable relates to chronometric dating, an especially valuable line of research, scores are multiplied by a weighting factor of 3.

Presence of Perishable Artifacts

Some rockshelters or cave sites in the study area have the potential to yield artifacts made of perishable material. Because such materials are rarely preserved in the archaeological record, and because a large percentage of a prehistoric group's material culture probably consisted of perishable material, sites yielding perishables are especially important cultural resources. Scores for this variable reflect simple presence (1) or absence (0). Scores are multiplied by a weighting factor of 3.

Discreteness of Components

Single-component sites or sites with multiple components that are vertically or horizontally discrete have higher research value than sites with multiple components that are difficult or impossible to differentiate. Apparently single-component sites or site sites where components are spatially separated are given a score of 1. Sites where components are apparently mixed are given a score of 0. The scores are not weighted because of difficulties in discerning components with surface data in the study area.

Presence of Animal Bone

Animal bone from archaeological contexts is occasionally found on site surfaces, particularly in rockshelters. Burned bone may also endure at open sites. Sites with bone have a high potential for yielding important subsistence information. Sites with surficial bone are given a score of 1, and sites without are scored 0. Scores are not weighted.

Presence of Diagnostic Artifacts

Sites with diagnostic artifacts on the surface have high research value because research questions specific to a particular archaeological unit can be applied. Sites with diagnostic artifacts are scored 1 and sites without them are scored 0. Scores are not weighted.

Presence of Unusual Artifacts

Sites with obsidian or ceramics are likely to provide valuable information about technology and trade. When obsidian and/or ceramics are found, sites are given a score of 1, and when are absent, they are scored 0. The two artifact classes are combined to minimize bias towards large, complex sites, which are more likely to yield an especially diverse artifact assemblage. Scores are not weighted.

Example of Significance Ranking Matrix

To illustrate the significance ranking scheme, a sample of 20 prehistoric sites was selected from a recent intensive cultural resource inventory conducted by Alpine personnel in the UPAP study area (McGuire 2003). Formulation of significance recommendations had been completed, independent of this ranking scheme. Scores for various site variables were extracted from the site records. Although site records were completely adequate for determining the presence or absence of artifacts and features, it was more difficult to derive scores for more complex variables, such as

contextual integrity and subsurface potential. This problem would have been avoided if the site recorders had scored these variables when the site was recorded.

The significance matrix is presented in Table 41. The distribution of the adjusted scores, obtained by multiplying variable scores by the weighting factors, is shown on Figure 4. The histogram indicates whether the site recorders recommended the sites as eligible or ineligible for listing on the National Register of Historic Places. If this writer had completely understood the recorders' perspectives about the sites' significance, the significant sites should have all had high adjusted scores (i.e., variable scores multiplied by weighting factors), and the insignificant sites should have all had low adjusted scores. In general, this pattern can be detected in the histogram. There are, however, four sites that were recommended as significant sites that have roughly the same scores as the sites that were recommended as insignificant. This may be due to errors of interpretation by this writer, by insufficient arguments about site subsurface potential or contextual integrity on the site records, or by inconsistent application of criteria between all project sites by the site recorders. Inconsistencies might have been avoided if field personnel had specifically addressed the more complex site attributes and would have utilized a site significant matrix. It should be noted that the distribution of adjusted scores does not closely resemble a normal distribution. This is partly due to small sample size, but probably mostly reflects the strong influence of the larger weighting factors, which may tend to clump scores at several points along the continuum.

Significance matrices are meant to serve as an aid and to permit more consistency in recommendations. Scores do not equal significance or insignificance. Archaeologists will recognize that other factors, not represented in the matrix, should sometimes be considered. A particularly rare site type, such as one with a probable Paleoindian component, should probably be given the benefit of the doubt and classified as significant, even in the event that the site yields a relatively low adjusted score.

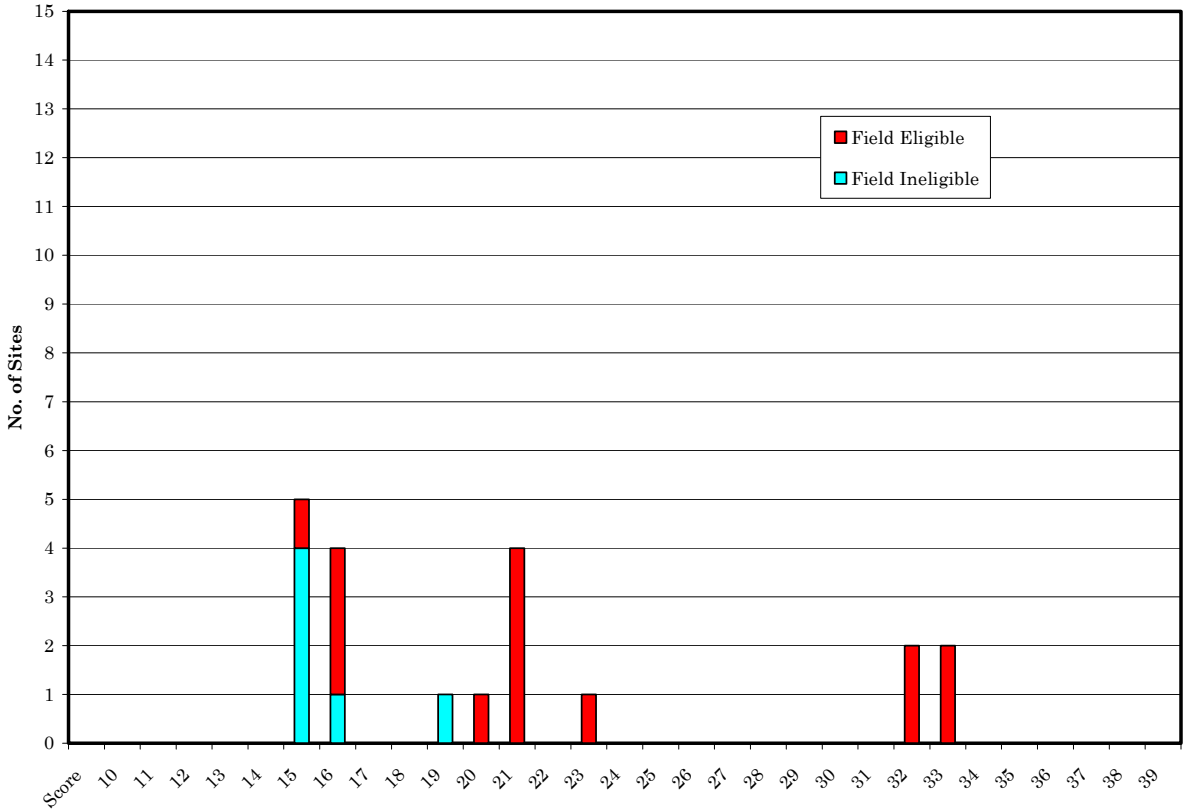


Figure 4. Distribution of significance ranking values.

Table 41. Example of Significance Matrix.

	WEIGHTING MULTIPLIER											
	5	3	3	3	3	3	3	1	1	1	1	
Variable	Contextual Integrity	Subsurface Potential	Habitation Structures	Thermal Features	TL Potential	Tree-Ring Potential	Perishables	Discrete Components	Animal Bone	Diagnostic Artifacts	Unusual Artifacts	Adjusted Scores
Score	3/2/1	3/2/1	1/0	2/1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	
Site No.												
5MN2515	2	3	0	0	0	0	0	0	0	1	0	20
5MN2554	2	2	0	0	0	0	0	0	0	0	0	16
5MN6499	2	2	0	0	0	0	0	0	0	0	0	16
5MN6500	3	2	0	0	0	0	0	0	0	1	0	22
5MN6501	3	3	0	2	1	0	0	0	0	0	0	33
5MN6502	3	3	0	2	1	0	0	0	0	0	1	34
5MN6503	3	2	0	0	0	0	0	0	0	1	0	22
5MN6504	2	2	0	0	0	0	0	0	0	0	0	16
5MN6602	2	2	0	0	0	0	0	0	0	0	0	16
5MN6603	2	2	0	0	0	0	0	0	0	1	0	17
5MN6604	3	2	0	0	0	0	0	0	0	1	0	22
5MN6605	3	2	0	0	0	0	0	0	0	1	0	22
5MN6606	3	3	0	2	1	0	0	0	0	0	0	33
5MN6607	2	2	0	0	0	0	0	0	0	1	0	17
5MN6608	3	3	0	0	0	0	0	0	0	0	0	24
5MN6628	2	2	0	0	0	0	0	0	0	0	0	16
5MN6629	2	2	0	0	0	0	0	0	0	1	0	17
5MN6630	3	2	0	0	0	0	0	0	0	0	0	21
5OR1442	3	3	0	2	1	0	0	0	0	1	0	34
5OR1443	2	2	0	0	0	0	0	0	0	1	0	17

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